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The TIMBER RESOURCES of MAINE

By Roland H. Ferguson
and Neal P. Kingsley

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NORTHEASTERN FOREST EXPERIMENT STATION, UPPER DARBY, PA.
FOREST SERVICE, U.S. DEPARTMENT OF AGRICULTURE
WARREN T. DOOLITTLE, DIRECTOR

FOREWORD

UNDER the authority of the McSweeney-McNary Forest Research Act of May 22, 1928, and subsequent amendments, the Forest Service, U. S. Department of Agriculture, conducts a series of continuing forest surveys of all states to provide up-to-date information about the forest resources of the Nation.

The first forest survey of Maine was made in 1954-58 by the Northeastern Forest Experiment Station, with cooperation from many individuals, forest industries, and state agencies.

A resurvey of the timber resources of Maine was made in 1968-70, again with the cooperation of many persons and agencies. The Maine State Legislature, the forest industries, and the United States Department of Commerce contributed funds for aerial photography and purchase of the aerial photographs that were used for the resurvey. The Maine Forestry Department provided air transport to otherwise inaccessible areas, quarters for the Forest Survey crews, financial assistance, aerial photographs and information on forest-land ownership and output of timber products. The State of Maine Bureau of Taxation, Seven Islands Land Company, Great Northern Paper Company, Scott Paper Company, and Diamond International Corporation lent aerial photographs for field-plot locations. The forest industries that provided assistance and quarters for field crews were Great Northern Paper Company, International Paper Company, and Oxford Paper Comapny. The Seven Islands Land Company also provided assistance and quarters for the field crews. The entire operation received excellent help and cooperation.

The resurvey of the State was directed by Carl E. Mayer, leader of the Forest Survey project. He was assisted by John R. Peters, who supervised many field crews over the 3-year period. Joseph E. Barnard was responsible for applying the general sampling procedures used by the Forest Survey to meet the specific requirements for the Maine inventory. This involved considerations of sampling accuracy desired, sampling procedures to be used, and final data requirements. He and David R. Dickson augmented the generalized computer system FINSYS for the specific data requirements of the Maine inventory. This included the processing of nearly 100,000 records of plot and tree data on a large high-speed computer system. The authors and Barnard checked the consistency of the new inventory with the previous inventory. They made frequent use of the TRAS model in this phase of the data analysis.

James T. Bones, with the cooperation of the Maine Forestry Department, collected and compiled data on timber-products output and plant residues. Teresa M. Bowers assisted in computing information pertinent to the sampling design and compiling the data tables included in this report. Carmela M. Hyland assisted with administrative services for the field crews and typed the manuscript and tables of this report.

The last field plot in Maine was taken in December 1970; photo interpretation was completed in April 1971; and the final computer output of the resource data was available in May 1971.

The TIMBER RESOURCES of MAINE

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COVER PHOTO

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A towboat pulls a "bag boom" of pulpwood through Chesuncook Lake in the shadow of Mt. Katahdin. This scene will soon be a thing of the past. Because of a concern for water quality and possible damage to the environment, the 105th Maine Legislature has mandated that all pulpwood and long-log drives on principal rivers must cease by 1976. Booming through the lakes has been common practice in river driving.

GREAT NORTHERN PAPER COMPANY PHOTO

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The Resurvey

THE FIRST forest survey of the timber resources in Maine was conducted from 1954 to 1958. Now the second forest survey of the State, some 12 years later, shows that a number of important changes have taken place.

This report summarizes the present timber-resource situation and the changes that have taken place since the initial survey. Trends in timber supply, including a discussion of timber availability, are pointed out, and projections of future timber supply are made.

NINE GEOGRAPHIC UNITS

To obtain meaningful data on other than state totals, the State was divided into nine geographic sampling units for the resurvey. These units consist of one to four counties. Each unit was delineated to be as homogenous as possible. All but one of the sampling units contain more than 1 million acres of commercial forest land.

In the initial forest survey, six sampling units of irregular boundaries were recognized. It is planned to use the nine units defined for this re-inventory as the basic units for the next resurvey, thus permitting comparisons of trends at less than the statewide level. Because of the changes in the sampling units, it is not possible to compare unit or county estimates of timber volumes in this report with those published in the timber resource report for 1959. Comparisons of volume estimates given in this report were made only after putting the initial survey estimates on the same basis as the resurvey. The improved accuracy of the new estimates far outweighs the lack of directly comparable unit data for both inventories.

The geographic sampling units in Maine, 1968-70.

SAMPLING THE RESOURCE

In the resurvey a large number of initial field plots were remeasured to provide estimates of average annual net timber growth, average annual timber removals, land-use change, and to update the initial forest-inventory volume estimates. To develop an independent second estimate, new field plots were established and measured. These two samples yielded independent estimates, which were weighted and combined to give the current estimates of forest area and timber volume reported in this publication. A more detailed discussion of the design and sampling procedure can be found in the appendix.

Sampling errors, which indicate the reliability of the estimates, are shown for most of the totals and subtotals of the new estimates. Definitions of forest-survey terms and the discussion about reliability of the estimates are presented in the appendix. Users of these timber-resource data are strongly advised to read these definitions and explanations carefully.

Highlights of the Findings

In the 12 years between the initial forest survey and the resurvey, many significant changes have taken place. Here briefly are some of the more important findings of this second forest survey of the Pine Tree State:

- Total forest land area is 17,749,000 acres, an increase of almost 3 percent since 1959.
- Commercial forest land increased 3 percent and now totals 16,900,000 acres.
- Forest industries own 49 percent of the commercial forest land, up from 38 percent in 1959.
- Sawtimber stands make up more than one-third of the commercial forest land area and average 3,830 board feet per acre.
- Growing-stock volume increased 23 percent to 21 billion cubic feet. Softwoods increased at a much greater rate than hardwoods.
- Softwoods make up 70 percent of the growing-stock volume. Spruces account for 26 percent, balsam fir 24 percent, and white pine 7 percent.
- Poletimber trees make up 57 percent (12 billion cubic feet) of the total growing-stock volume.
- Sawtimber volume increased 19 percent to 35 billion board feet. Largest increases were in spruce and fir volumes.
- About two-thirds of the sawtimber volume is in trees less than 15.0 inches d.b.h.
- Annual net growth for 1970 was 711 million cubic feet of growing stock, including 1,622 million board feet of sawtimber.
- Timber removals for 1970 were 409 million cubic feet of growing stock, including 1,299 million board feet of sawtimber.
- Although growth exceeds removals for total growing stock, the growth-to-removals ratios of some important species and sizes of timber show overcutting.
- More white pine, northern white-cedar, yellow birch, and sugar maple sawtimber volume is being cut than grown.
- Projections of future timber supply show that, if present removal trends continue, hardwood removals will exceed growth within a few years, and softwood removals will exceed growth before the turn of the century.
- A greatly increased effort at forest management, particularly of hardwoods, is indicated if timber growth in Maine is to keep pace with demand.

Timber-Resource Trends

Nine-tenths of Maine's land area is covered by forests, and less than 5 percent of the forest area is classified as noncommercial. No other state has so large a proportion of its land area in forests. Maine's forests supply the timber industries with huge volumes of wood; Maine's forests protect the water supply of hundreds of lakes, ponds, and streams; Maine's forests provide recreation in many forms, such as canoeing, fishing, and hunting.

Since the first forest survey of Maine, many definitions, procedures, and methods have been changed as a result of improved forest-inventory and data-processing techniques. This means that to analyze actual trends between surveys, the initial survey estimates must be put on a basis comparable to the resurvey estimates. The 1959 estimates are valid for the procedures and definitions used at that time, and should not therefore be discounted *(2)*. The trends in commercial forest-land area, growing-stock volume, and sawtimber volume, after adjustment of the 1959 data to the resurvey standards, are presented below.

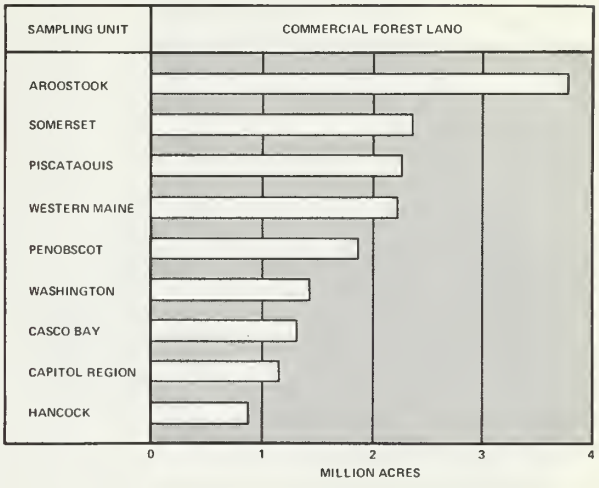
Change in area and volume, 1959-71

	1959	*1971*	*Change*
Commercial forest land: *(thousand acres)*	16,417	16,894	+ 477
Growing-stock volume: *(million cubic feet)*			
Softwoods	11,460	14,763	+3,303
Hardwoods	5,769	6,490	+ 721
Total	17,229	21,253	+4,024
Sawtimber volume: *(million board feet)*			
Softwoods	18,832	23,456	+4,624
Hardwoods	10,255	11,064	+ 809
Total	29,087	34,520	+5,433

SMALL CHANGES IN TOTAL FOREST AREA

Land-use changes between surveys resulted in a net increase in forest-land area of 2.6 percent. Maine is still the most heavily forested state in the Nation: 90 percent of its land area is classed as forest land. About 60 percent of the commercial forest land is in the four northern counties—Aroostook, Penobscot, Piscataquis, and Somerset. Aroostook County, with 3,800,000 acres of commercial forest land, has 22 percent of the State's total. The commercial forest-land area in the small counties that make up the Casco Bay and Capitol Region units average about 300,000 acres.

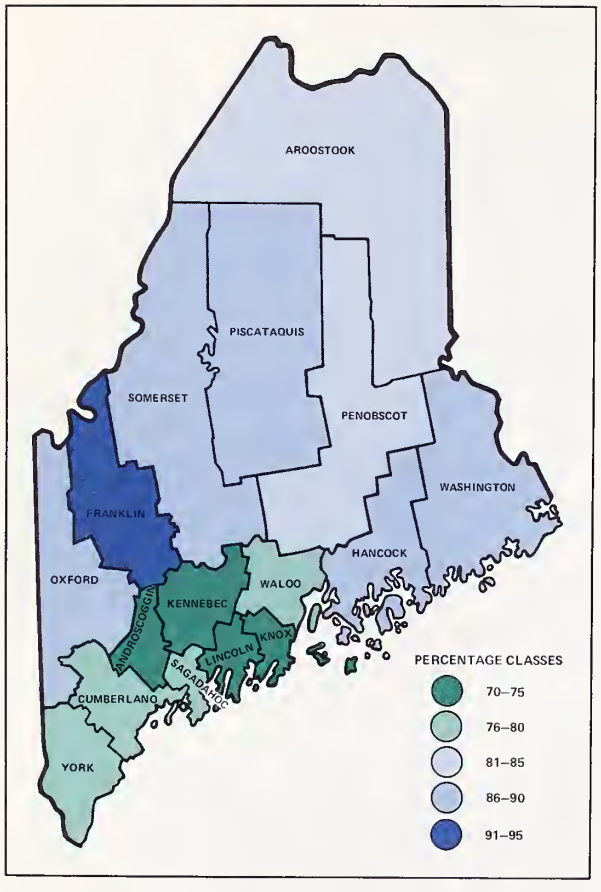
The commercial forest-land area in Maine, by geographic units.



The commercial forest-land area in the State increased 2.9 percent, to 16.9 million acres. All but one county—Somerset—had increases in commercial forest land. Commercial forest land makes up 86 percent of the land area in the State. The percentage for individual counties ranges from 70 percent (Kennebec and Knox Counties) to 91 percent (Franklin County).

Noncommercial forest land totals 854,000 acres and accounts for 4 percent of the total forest area. This acreage consists of 221,000 acres of productive - reserved forest land (174,000 acres in Baxter State Park, Piscataquis County) and 634,000 acres of nonproductive forest land. Three of the geographic units—Aroostook County, Penobscot County, and Western Maine — have more than 100,000 acres each of nonproductive forest land.

Percentage of land area in forest, by counties.



OWNERSHIP HAS SEVERAL UNIQUE CHARACTERISTICS

Forest Industries Own Nearly Half the Forest Land

Forest industries own 8.3 million acres—49 percent — of Maine's commercial forest land. Pulp and paper companies own about 93 percent of this land, lumber companies own about 7 percent, and various other wood-using firms own less than 1 percent. In no other state do forest industries own such a large share of the commercial forest land.

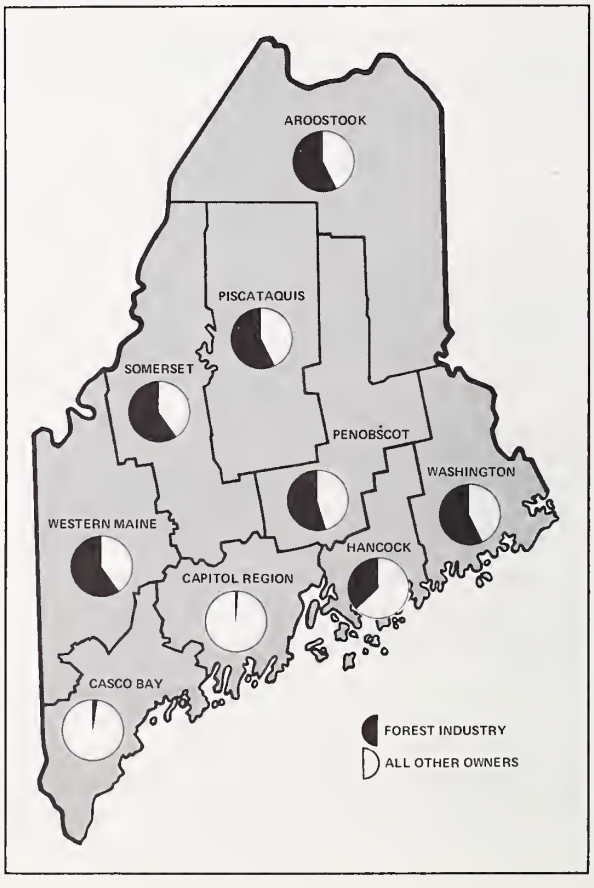
Most of the forest-industry holdings are in the large northern counties. Only in the three coastal geographic units—Casco Bay, Capitol Region, and Hancock County, do forest industries own less than 50 percent of the commercial forest land. In these three units—a total of nine counties—forest industries own only 10 percent of the commercial forest land.

Forest-industry holdings have increased about 27 percent since 1959—from 6.5 to 8.3 million acres. Most of this increase is the result of land acquisitions by several large forest-based companies. Although forest industries have increased their ownership since 1959—to insure continuous supply of raw material — most industry-owned land continues to be open to the general public for recreation.

Farmers own 1.1 million acres of Maine's commercial forest land, about 7 percent of the total. This total is down from the 1959 estimate of 2.0 million acres. The area held by all other private owners also declined—from 7.7 million acres in 1959 to 7.2 million acres in 1971—a drop of 6 percent.

Publicly owned commercial forest land in Maine totals only 311 thousand acres or about 2 percent of the total. Federal ownerships total less than 0.5 percent of the total.

Percentage of forest land owned by forest industry, by units.



State, and county and municipal ownerships account for about 1 percent each. Public ownership of commercial forest land in Maine is the lowest percentage of any forested state in the Nation.

A Unique System of Forest Land Ownership

A substantial area of forest land in the "unorganized" northern portion of the State is held by owners who have a "common and undivided interest" in the land. This means that, for example, five owners may each own one-fifth of a parcel of land, yet no boundaries have been laid out and none of the owners can identify his portion on the ground. What's more, few of these owners have any need or desire to identify his portion. As far as is known, this system of land ownership is found nowhere else in the world.

The evolution of this system is an outgrowth of the early history of Maine. Most of what is now the State of Maine was first held by the Massachusetts Bay Company, later by the Province of Massachusetts, and then after the American Revolution by the Commonwealth of Massachusetts. In 1820 Maine, as one-half of the Missouri Compromise, separated from Massachusetts and became the twenty-third state to join the Union.

In the early years of statehood some 8 million acres of unlocated lands were jointly owned by both Massachusetts and the fledgling State of Maine. Both states were hard pressed for revenues and began selling these lands to investors and speculators. Because the owning of timberlands in such a remote region as northern Maine was considered a risky investment, many of these investors and speculators sought a means of spreading the risk.

To do this, as many as six individuals would purchase an unorganized township and hold it in common ownership and undivided

A township line in the unorganized portion of Maine can be distinguished only by the size of the timber. The township at the left was cut over 40 years ago; the one on the right was not.

GREAT NORTHERN PAPER COMPANY PHOTO

interest. With this form of ownership, no division lines were drawn, and each of the owners held his personal undivided share of the total. Gains and losses from the ownership of the land were also shared according to each owner's interest in the total. Thus, if some of the timber on the township were harvested, each owner would receive his proportionate share of the proceeds even if all the timber was harvested from one part of the township. Conversely, if a fire, insect outbreak, or other natural catastrophe struck the township, each owner would share in the loss according to his proportional share.

Surprisingly, this system has worked exceedingly well, and the cooperation between many diverse owners has generally been excellent. In fact, the system has succeeded so well that today a substantial portion of the land in the unorganized territory is still held in common and undivided ownerships, and the present owners show little inclination to alter the situation.

Over the years, inheritance and land sales have brought about more and more complex fractional shares. For instance, one 1963 deed conveyed a "31/52 part of a one-eighth interest in common and undivided" land in a certain township. A present-day owner has a 332/33280 common and undivided interest in this same township *(1)*.

A Unique System of Forest Land Management

A unique system of managing forest land has developed in Maine as an outgrowth of the system of common and undivided ownership. Beginning as far back as 1840, groups of owners have banded together to form a unified land-management system. To do this, groups of owners have formed organizations, retained individuals or firms, or have delegated to one of the owners all management and ownership responsibilities. Under this system the manager essentially assumes the owner's role in forest management and other decisions regarding the land. The time, place, and volume of timber to be harvested is determined by the land manager. The proceeds from the sale, less operating costs, are then divided among the owners in accordance with each owner's share. This system makes it possible to manage these common and undivided ownerships as though they were a single ownership.

Not all the land in some townships that is held in common and undivided ownership belongs to owners who have joined together in a management organization. A common occurrence is for one of the major owners to be a large industrial firm. In such cases the land-management organization negotiates with the nonmember owner or owners and they jointly arrive at an agreement on management objectives and responsibilities.

At present there are approximately 3.2 million acres of commercial forest land in Maine that is being managed by such land-management organizations. This acreage is included in the individual private total in table 2 (appendix), because the actual owners of the land are in fact individuals. These lands are not considered forest-industry lands because neither the owners nor the land-management organizations operate wood-processing plants. All revenues derived from these lands are from the sale of standing timber, recreation leases, or in a few cases mineral leases.

These land-management organizations provide an opportunity for long-term forest management with continuity. Through successive generations of owners, management of the forest resources can proceed in planned and orderly fashion. The frequent change of owners is often a serious deterrent to successful forest management on individual private ownerships. Some of these lands have been managed for over 100 years.

SIXTY PERCENT OF FOREST STANDS ARE FULLY STOCKED

Most of the forest land in Maine is well stocked. Much of it is probably overstocked for optimum growing conditions. Less than 1 percent of the commercial forest land is nonstocked. When all live trees, including rough and rotten trees, are considered in determining the stocking percentage, about nine-tenths of the commercial forest area is fully stocked. If rough and rotten trees are excluded from the determination, about six-tenths of the area is fully stocked. This situation is not unfavorable as far as the pulpwood industry is concerned, for much of the volume in rough trees is suitable for pulpwood. However, since such volume is not suitable for lumber, the situation for the lumber industry is much less favorable.

Forest stands that are medium to fully stocked with growing-stock trees occupy 90 percent of the commercial forest-land area. Of the total forest land owned by forest industry, 92 percent is in this category. All other ownerships have an average of 87 percent.

Nonstocked forest land in 1959 made up 3 percent of the total commercial forest land. In 1971 less than 1 percent (143,000 acres) of the total commercial forest land was classified as nonstocked.

SAWTIMBER STANDS COVER MORE THAN ONE-THIRD OF AREA

Acreages in the stand-size categories for 1959 and 1971 are not on the same basis, so differences are not actual trends.

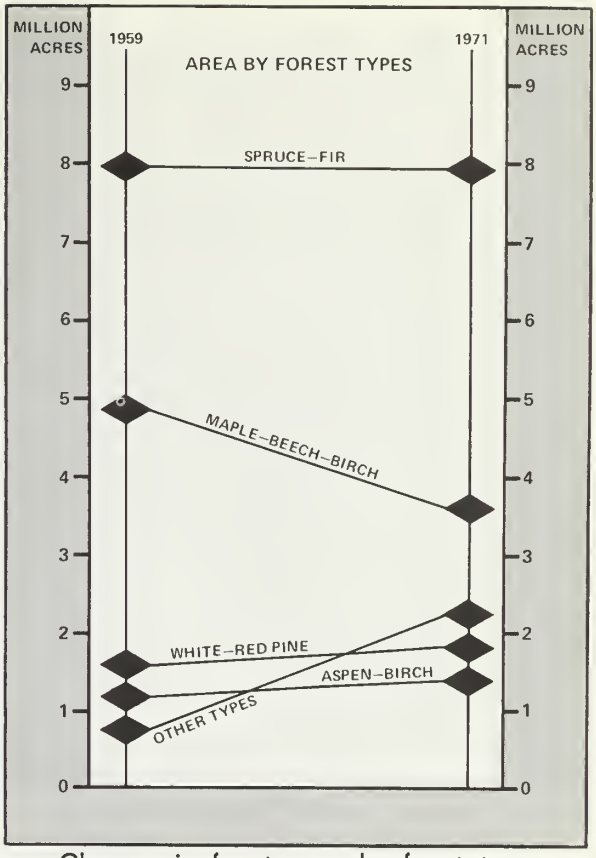
Sawtimber stands total 6,143,000 acres and average 3,800 board feet per acre. They make up 36 percent of the commercial forest area. About 45 percent of the commercial forest area (3,684,000 acres) owned by forest industry is classified as sawtimber stands. About 28 percent of the commercial forest land in all other ownerships is in sawtimber stands.

Acreage in poletimber stands adds up to 5,340,000 acres and accounts for 32 percent of the commercial forest area. These stands contain on the average 1,500 cubic feet (about 18 cords) per acre. Nearly 35 percent of the commercial forest land owned by forest industry is in this class, and 28 percent of the area in all other ownerships is in poletimber stands.

Area in sapling-seedling stands for all ownerships totals 5,269,000 acres and makes up 31 percent of the commercial forest-land area. About 20 percent of the forest industry's timber stands is in this class, and more than 40 percent of all other ownerships is in this class. Only 1 percent of the commercial forest-land area is nonstocked.

MAPLE—BEECH—BIRCH TYPE DECREASED

Forest-type classifications used on the initial survey are fairly comparable to the forest-type classifications used on the resurvey. Differences in acreages between surveys can be attributed to actual trends.



Changes in forest area by forest types, 1959-71.

In the resurvey 20 local forest types were recognized. These local forest types were combined into seven national major types. (See table 40.) For example, the white pine-red pine-hemlock major type totals 1,812,000 acres. The total area of the three local forest types other than white pine accounts for more than one-half of the acreage—the hemlock type, 601,000 acres; the white pine-hemlock type, 299,000 acres; and the jack pine type, 26,000 acres.

Maple-beech-birch. — The maple-beech-birch forest type (northern hardwoods) was the only major type that decreased in area. In the timber stands that made up this type on the initial survey, the more valuable sugar maple and yellow birch were cut and most of the red (soft) maple was not. The proportion of red maple in many stands changed enough to make up a plurality of stocking. Therefore the forest-type classifications often changed to the elm-ash-red maple or other types.

The maple-beech-birch forest type de-

The maple-beech-birch type is the only major forest type in Maine that decreased in area.

creased more than 25 percent from 4,904,000 acres to 3,561,000 acres, but is still the second largest forest type and accounts for 21 percent of the total forest area in the State. This type makes up more than 18 percent of the commercial forest land in all countries except those in the four coastal units, where it averages about 8 percent. Somerset, Franklin, and Oxford Counties (with 26 percent of the State's commercial forest-land area) have 32 percent of the acreage in the maple-beech-birch forest type.

Spruce-fir.—This forest type covers 47 percent of the forest-land area in Maine. The 7,949,000 acres of commercial forest land in this type is more than double that for the next most extensive forest type (maple-beech-birch). This acreage is about the same as it was in 1959. Seventy percent of the spruce-fir type is found in the four northern counties — Aroostook, Penobscot, Piscataquis, and Somerset.

White pine-red pine-hemlock.—The white pine-red pine-hemlock forest type is the third most prevalent type; it accounts for a little more than 10 percent of the commercial forest land area. This major type increased 15 percent, from 1,577,000 acres to 1,812,000 acres; but the increase was in the local hemlock forest type. White pine was cut rather heavily during the period between surveys while hemlock was cut lightly. The local white pine types decreased about 2 percent in area, and the local hemlock type increased about 45 percent. The three largest counties — Aroostook, Piscataquis, and Somerset—have the least area in the white pine-red pine-hemlock forest type, less than 90,000 acres each.

Elm-ash-red maple.—This forest type increased in area from 484,000 acres to 1,714,000 acres and makes up 5 percent or more of the commercial forest land in all geographic units. This increase coincides with

The spruce-fir type is Maine's most extensive forest type.

White pine stands like this are hard to find in Maine.

MAINE FORESTRY DEPARTMENT PHOTO

the large increase in the volume of red maple and elm. The large increase in acreage of the elm-ash-red maple type almost offsets the large decrease in acreage of the maple-beech-birch type.

Other forest types.—The other major forest types together—oak and oak-pine and aspen-birch — increased 27 percent in area from 1,466,000 acres to 1,857,000 acres. The 438,000 acres of the oak types and 1,419,000 acres of the aspen-birch type account for 11 percent of the commercial forest-land area.

INCREASE IN VOLUME WAS NOT EVENLY DISTRIBUTED

VOLUME IN SMALL TREES UP

The total volume of growing stock (all commercial tree species 5.0 inches d.b.h. and larger) rose from 17.2 billion cubic feet in 1959 to 21.3 billion in 1971—a 23-percent increase. However, this increase in volume was not evenly distributed among all diameter classes. The cubic-foot volume in 6- to 12-inch d.b.h. trees rose 28 percent, while the volume in 14- to 18-inch d.b.h. trees rose 13 percent. But the volume in trees 20 inches and larger d.b.h. declined 10 percent.

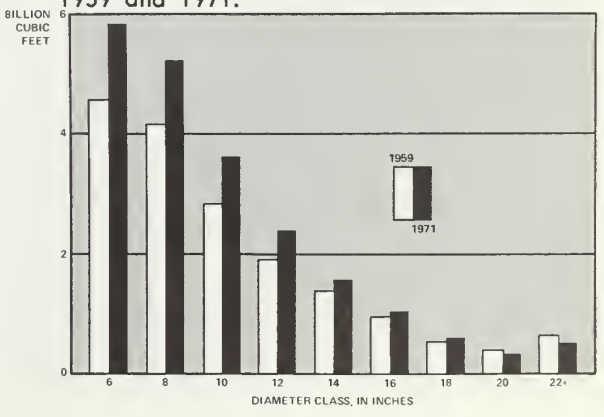
This changed distribution by tree sizes is reflected in the sawtimber trend. The volume in sawtimber trees (growing-stock trees 9.0 inches d.b.h. and larger for softwoods and 11.0 inches and larger for hardwoods) increased 19 percent—from 29.1 to 34.5 billion board feet. The volume in sawtimber trees less than 18 inches d.b.h. increased 31 percent, but the volume in trees larger than 18 inches d.b.h. declined 46 percent.

Volume Suitable for Pulpwood Increased

The volume suitable for pulpwood totals 266 million cords (22.6 billion cubic feet). Most of this volume is in growing-stock trees —a total of 250 million cords. The other 16 million cords (6 percent of the total) are in trees too rough or too crooked to produce sawlogs (non-growing stock). Volume suitable for pulpwood in 1959 averaged about 14 cords per acre and increased to 16 cords per acre by 1971.

The total volume suitable for pulpwood increased 24 percent since 1959. The softwood component had a greater increase than the hardwood; softwoods increased 27 percent and hardwoods 18 percent. Two-thirds of the volume suitable for pulpwood in 1971 (183 million cords) is made up of the softwood species. Spruce accounts for 26 percent of the total volume for all species, and balsam fir accounts for 23 percent. Red maple, white

Growing-stock volume by diameter classes, 1959 and 1971.



pine, and sugar maple follow in descending order of abundance.

Volume Suitable for Turnery Bolts

The wood-turning industry is an important timber-based industry in Maine. Because wood suitable for turning must be clear and rot-free, wood turners have a constant problem of finding suitable high-quality paper birch, yellow birch, sugar maple, and beech—the four principal species used by the industry.

Using forest-survey data and procurement specifications supplied by several wood-turning firms in Maine, we estimated the growing-stock volume in these four species that would be suitable for turnery bolts. About 616 million cubic feet of growing stock is suitable for turnery bolts (in rot-free trees, 8 inches d.b.h. and larger, that have 8 feet or more of the first 16 feet of bole in 2-foot clear cuttings). About 62 percent of this volume is in trees 12 inches d.b.h. or smaller.

The total suitable volume consists of: sugar maple—245 million cubic feet, yellow birch—167 million, paper birch—138 million, and beech—66 million. This volume makes up a little more than 18 percent of the total growing-stock inventory of these species. In view of the scarcity of wood suitable for turnery bolts in Maine and the present heavy cutting of these species for all products, wood turners can expect even greater difficulties in obtaining sufficient satisfactory raw material in the years to come than they have experienced in recent years.

VOLUME PER ACRE UP

The volume of growing stock per acre rose from 1,050 cubic feet in 1959 to 1,258 cubic feet in 1971. The average volume of sawtimber per acre increased from 1,770 board feet in 1959 to 2,040 in 1971.

Forest-industry ownerships accounted for most of the increase in the average sawtimber volume per acre. Sawtimber volume per acre on forest-industry-owned lands is 2,310 board feet, well above the statewide average for all ownerships. All other ownerships combined averaged 1,790 board feet per acre, up only 5 percent from the 1959 average of 1,700 board feet per acre. This reflects a higher level of demand for sawtimber-size trees from private nonindustry lands, particularly in the southern and western sections of the State.

VOLUME ON PRIVATE NONINDUSTRY LAND DECLINES

Combined changes in volume per acre and forest area owned brought about substantial differences in volume in each class of ownership. The sawtimber on forest-industry lands increased from 12.2 billion board feet in 1959 to 19.1 in 1971. On public ownerships sawtimber volume rose from 386 million board feet to 529 million. But on the private nonindustry lands, sawtimber volume declined from 16.5 billion board feet in 1959 to 14.9 billion in 1971. The volume of all growing stock showed similar changes except that the decline in growing-stock volume for private nonindustry lands was only 7 percent compared with the 9-percent drop for sawtimber.

SAWLOG QUALITY DECLINES

The volume of hardwood sawlogs that met minimum specifications for log grade 1 declined from 17 percent of the total sawlog volume in 1959 to 12 percent in 1971. The volume of log grade 1 hardwood sawlogs now stands at 1.3 billion board feet.

The decline of volume in the large diameter classes, coupled with a high level of demand for quality hardwood sawlogs, appears to have brought about this situation. The log grade rules for hardwood logs for all practical purposes exclude 12- and 14-inch d.b.h. trees from producing a grade 1 sawlog because a grade 1 log must have a minimum diameter of 13 inches inside bark at the small end. It is highly unlikely that a 14-inch d.b.h. tree could have such a log. Thus an increase in the proportion of sawlog volume in 12- and 14-inch d.b.h. trees alone would bring about a decline in the proportion of log grade 1 material. As has been shown, this has happened in Maine. Also there has been a strong demand for quality hardwood sawlogs—particularly sugar maple, yellow birch, paper birch, and ash—which has also contributed to the decline.

The volume of log grade 1 material in the five major species that account for 75 percent of Maine's hardwood sawtimber removals (red maple, sugar maple, yellow birch, paper birch, and ash) decreased 35 percent. But the vol-

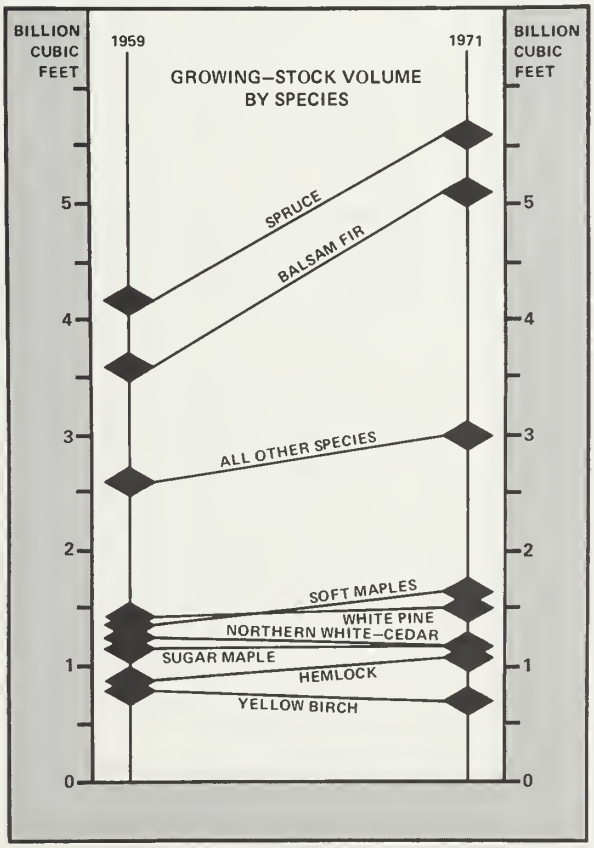
ume of grade 1 material in the other hardwood species more than doubled.

White pine is the only softwood species that was graded for sawlog quality. The volume of white pine in grade 1 sawlogs is 162.5 million board feet—less than 4 percent of the total white pine sawlog volume in Maine. In fact, grade 1 and 2 white pine sawlogs make up only slightly more than 12 percent of the total white pine sawtimber volume.

MANY FACTORS AFFECT CHANGES IN VOLUME OF MAJOR SPECIES

Because of the variety of species, products, and forest conditions found in Maine, a discussion of changes in volume by broad groups of species, such as hardwoods and softwoods, masks many important changes in individual species. For this reason, a species-by-species discussion of changes in some of the more important commercial species seems in order.

Spruce. — The spruces (red, white, and black) are the most abundant species group in Maine: 5.6 billion cubic feet—up from 4.2 billion in 1959. This 34-percent increase was the largest gain of any softwood species except balsam fir. The spruces make up one-fourth of Maine's sawtimber volume. Much of this large increase in spruce is the result of a recovery from the devastating spruce budworm attacks and fires that occurred in the first quarter of the century. Many of the spruce that replaced those killed in these attacks were too small to be classed as growing stock in the 1959 survey but by 1971 they had grown to growing-stock size.



Changes in growing-stock volume by species, 1959-71.

Most of the spruce volume in Maine is found in the northern half of the State. The four northernmost counties—Aroostook, Piscataquis, Somerset, and Penobscot—together account for nearly three-fourths of the total spruce growing stock in the State.

Balsam fir. — The volume of balsam fir growing stock increased 42 percent to a total of 5.1 billion cubic feet in 1971. The volume of balsam fir sawtimber increased 30 percent to 4.5 billion board feet. However, because of balsam fir's characteristic small size, 90 percent of the sawtimber is in the 10- and 12-inch d.b.h. classes. Again, this large increase in fir volume, like the increase in spruce, is probably attributable to a recovery from budworm attack and fire.

Balsam fir is associated with spruce and is therefore also concentrated in the northern portion of the State. The four northernmost counties account for 80 percent of the growing-stock total.

White pine.—The volume of white pine growing stock (together with a small volume of red pine) increased only 8 percent since 1959 to 1.5 billion cubic feet. White pine sawtimber volume increased less than 10 percent to 4.6 billion board feet.

This small increase appears to be the result of different causes in southern and northern Maine. In southern Maine the principal cause appears to be a strong demand for white pine sawlogs. In northern Maine it appears to be the result of a combination of natural factors. First, white pine blister rust is widespread in this area and causes appreciable mortality. However, eradication of ribes plants, the alternate host of the disease and the principal control technique, is not economically feasible because of the scattered distribution of white pine in northern Maine.

Second, white pine does not reproduce well in northern Maine, except in areas that have been burned over.

Hemlock.—The volume of hemlock growing stock rose 30 percent between surveys and now totals 1.2 billion cubic feet. The sawtimber portion increased 28 percent. This large increase was due in part to the low level of demand for hemlock in Maine. Hemlock is most abundant in Penobscot County —280 million cubic feet—and in the Casco Bay Region—212 million cubic feet.

Northern white-cedar. — The volume of northern white-cedar in Maine remained essentially unchanged at 1.2 billion cubic feet. In Somerset County, however, the sawtimber volume declined 12 percent. It appears that the demand for northern white-cedar of all size classes just offsets the growth of the species. During the 12 years between forest surveys, the harvest of northern white-cedar in Maine rose from 16.9 million board feet in 1958 to 40.4 million board feet in 1970.

A large portion of this increase can be attributed to the growth of the rustic-fencing industry, which in Maine consumes primarily northern white-cedar. In 1958 rustic fencing accounted for 47 percent of the northern white-cedar harvest, but by 1970 its share had risen to 60 percent. Accompanying this growth in the rustic-fencing industry, the demand for cedar shingles and power poles, mostly from sawtimber size trees, remained strong.

Red maple.—Red (soft) maple growing-stock volume exceeds that of any other hardwood species in Maine and is found abundantly throughout the State. Red maple volume increased 20 percent since 1959 to 1.6 billion cubic feet in 1970. Sawtimber volume of red maple rose 24 percent during the period between surveys.

A possible explanation for the large increase in red maple volume is the low demand for this species and the high demand for such associated species as sugar maple and white pine. In many areas this has allowed red maple to dominate sites that were formally occupied by a mixture of several species.

Sugar maple. — Growing-stock volume of sugar (hard) maple increased 8 percent to total 1.2 billion cubic feet. Sugar maple sawtimber increased only 5 percent to 3.2 billion board feet and accounts for 29 percent of the hardwood sawtimber volume in Maine.

This species is in great demand for a variety of products, and it accounted for 18 percent of all hardwood sawtimber removals in 1970. This demand has played an important role in the decreasing relative abundance of sugar maple. In addition, the cull increment of sugar maple sawtimber (the volume of growing-stock trees in 1959 that became rough or rotten trees by 1970) was abnormally high. Harvesting practices have probably also influenced this development to some extent. When poor-quality trees are left standing, they frequently become rough or rotten trees and occupy growing space that would be better occupied by younger and healthier trees.

Yellow birch.—Yellow birch ranks third among the hardwoods in volume of growing stock. Since 1959 the volume of yellow birch growing stock has declined 8 percent to 744 million cubic feet.

The volume of yellow birch sawtimber declined 10 percent to 1.6 billion board feet. This decline was probably the result of a combination of factors. Yellow birch is in great demand for such products as veneer and turnery bolts as well as for lumber. The removals of yellow birch sawtimber during the period between surveys exceeded growth 3 to 1. Cull increment of yellow birch is also abnormally high. This may be the result of the birch dieback epidemic that occurred in the 1950's. Many trees that did not succumb to the disease were heavily damaged. This damage provided opportunity for rot, and thus many of these trees became non-growing stock.

Paper birch. — Growing-stock volume increased 15 percent to 740 million cubic feet in 1971, and sawtimber volume increased 17 percent. The increase in paper birch volume was not evenly distributed throughout the State. Paper birch growing stock increased less than 10 percent in Hancock County and in the Capitol and Casco Bay regions. Washington, Aroostook, and Somerset Counties registered gains of 20 to 30 percent. However, paper birch sawtimber volume increased in all counties except Hancock, where it remained unchanged. This variation by sampling units is probably the result of past cutting practices that do not favor birch regeneration, the absence of fires, and the different levels of demand for paper birch in different sections of the State.

NET GROWTH EXCEEDS TIMBER REMOVALS

Growing-stock volume increased 4.0 billion cubic feet during the 12-year period between surveys to 21.3 billion cubic feet in 1971. This increase resulted from less timber removal than net growth during the period—an average annual net change of 335 million cubic feet. Sawtimber volume increased 5.4 billion board feet during the same period to 34.5 billion board feet. Total sawtimber removal was less than net growth, and the average annual change was 452 million board feet. As pointed out earlier, although total volume of the average annual net growth exceeded total average annual removals, this is not true for some species whose removals were greater than net growth.

VOLUME OF INGROWTH IS LARGE

The average annual change in growing-stock volume and sawtimber volume is the composite of several components: growth on initial volume, ingrowth, change in merchantability (cull-tree increment), mortality, and timber removal. An unusual change in one or more of these components may account for an unusual difference in the average annual change. For example, one species may have had unusually high mortality, while another may have had unusually high cull-tree increment.

For most species in Maine, ingrowth is one of the most important components. The volume of ingrowth trees (growing-stock trees that were less than 5.0 inches d.b.h. on the initial survey and that grew to 5.0 inches d.b.h. and larger) made up 57 percent of the average annual gross growth of growing stock. Ingrowth accounts for such a large portion of gross growth because of the long period between surveys and because the mortality and cull increment of some species were unusually high. If this volume loss were cut in half and survivor growth of growing stock were increased accordingly, the ingrowth volume would have been less than 50 percent of gross growth.

Also, spruce and balsam fir (the two major species) show a high proportion of ingrowth as a result of recovery from the spruce budworm epidemic around 1920. Many young spruce and fir that seeded in in the 20's and 30's after this attack reached growing-stock size between 1959 and 1971.

Mortality of growing-stock trees and cull-tree increment together reduced the average annual gross growth by almost 30 percent. The volume for each of the components of average annual net change in growing stock is shown below:

	Million cubic feet	*Percent of gross growth*
Survivor growth of growing stock (accretion)	386.8	43
Volume and growth of trees that became poletimber (ingrowth)	+507.4	+57
Average annual gross growth	894.2	100
Cull-tree increment	−133.7	−15
Crowing-stock tree mortality	−123.7	−14
Average annual net growth	636.8	71
Average annual removals	−301.4	−34
Average annual net change	335.4	37

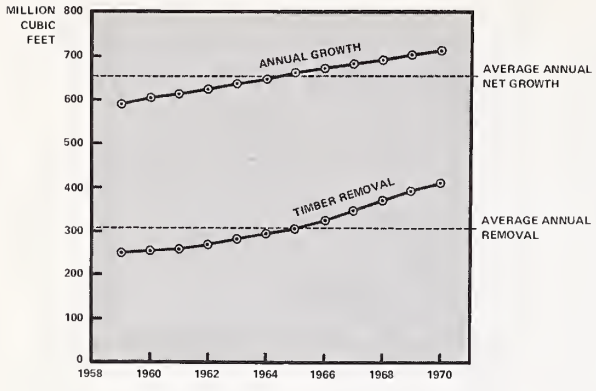
Ingrowth volume of growing-stock trees that grew into the sawtimber-size class also made up a very large percentage (62 percent) of the average annual gross growth of sawtimber. The volume of trees that died and the volume of trees that became non-growing stock reduced the volume of the average annual gross growth of sawtimber 34 percent. Average annual net growth of 1,063 million board feet exceeded the average annual removal of 610 million board feet and resulted in an average annual change of 453 million board feet.

REMOVALS INCREASE FASTER THAN GROWTH

Analysis of the changes that are taking place in the timber inventory of Maine shows that, even though annual net growth exceeded removals, removals are increasing faster than growth. This rate of increase is three times faster than the rate of increase in growth. Timber removal of growing stock as a percent of annual net growth in 1970 was 58 percent, as compared to 44 percent in 1959.

Annual net growth of growing stock for 1970 was 711 million cubic feet, or 12 percent more than the average annual net growth for the 12-year period. Timber removals of grow-

Average annual growth and removals and trends in growth and removals, 1959-70.



ing stock in 1970 totaled 409 million cubic feet and were 36 percent greater than the average annual timber removals for the period. Even though the rate of increase for timber removals is greater than the rate of increase of annual net growth for all species together, more timber of certain species—such as hemlock and red maple—could be cut if markets were readily available.

The situation for softwood growing stock is somewhat different than that for hardwoods. The annual net growth for softwoods in 1970 was 550 million cubic feet or, expressed as an annual rate of the inventory, it was 3.7 percent. Softwood removal in 1970 (275 million cubic feet) was 50 percent of the net growth. In contrast, the annual net growth for hardwood growing stock in 1970 was 161 million cubic feet; this was a rate of 2.5 percent. Hardwood removal in 1970 (134 million cubic feet) was 83 percent of the net growth.

Spruce and balsam fir growing stock had the greatest volume of net growth—404 million cubic feet. Together they accounted for 57 percent of the total net growth in 1970. The volume of timber removals in 1970 for these species totaled 148 million cubic feet and made up 36 percent of the total removals.

The ratio of growing-stock removals to net growth was not as favorable for several other important species as it was for spruce and fir. Net growth and removals were about equal for white pine and sugar maple, and removals were greater than net growth for some less abundant species such as oak, ash, and yellow birch.

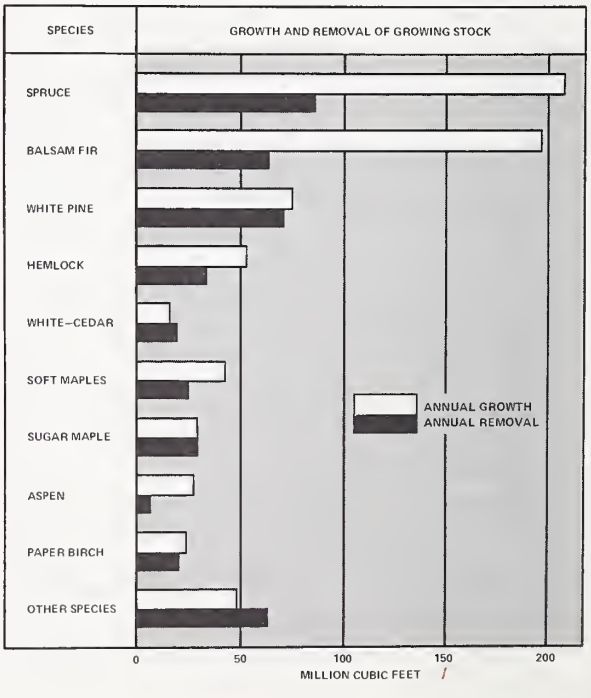
The sawtimber portion of growing stock generally had a less favorable relationship between annual net growth and timber removals than for growing stock as a whole. Removals of sawtimber volume were greater in relation to net growth than removals of growing-stock volume. Sawtimber removals as a percent of net growth in 1970 were 80 percent, while growing-stock removals were only 58 percent.

Net growth of sawtimber in 1970 was 1,622 million board feet, and sawtimber removals totaled 1,299 million. Sawtimber removals as a percent of annual net growth (80 percent) were considerably greater than in 1959 when they made up 60 percent.

Like growing stock, the sawtimber removals and net growth comparisons differed according to species groups. In 1970 softwood sawtimber removals (878 million board feet) were 28 percent below the net growth of 1,224 million board feet; hardwood sawtimber removals (421 million board feet) were 6 percent above the net growth of 398 million board feet.

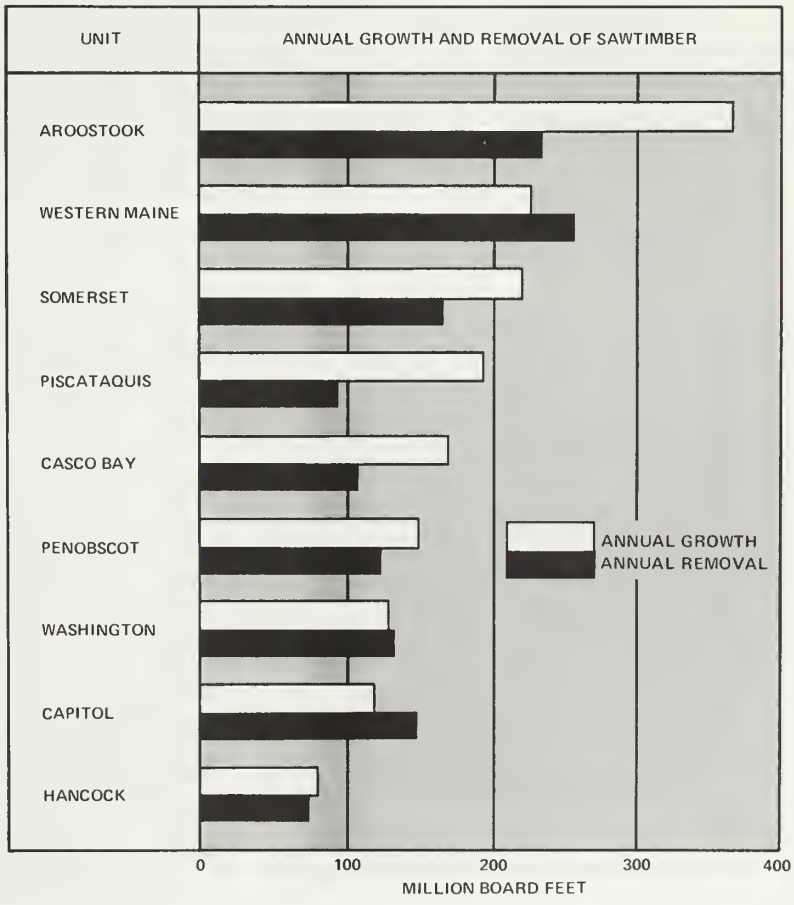
Sawtimber removals and net growth for 1970 also differed according to the geographic unit in the State. In five of the sampling

Net growth and removals of growing stock by species, 1970.



units, sawtimber removals averaged 60 percent of the net growth; however, in two sampling units—Washington and Hancock Counties—removals and net growth were about equal, and in the other two sampling units—Western Maine and the Capitol Region—removals of sawtimber volume exceeded net growth almost 20 percent.

Net growth and removals of sawtimber, by geographic units, 1970.



Timber-Products Output

The timber-products output estimates in tables 26 and 27 should not be confused with the estimates of annual timber removals shown in tables 19 and 20. Timber products output is that portion of total timber removals that was used for products. In addition to timber removed for products, timber removals include logging residues and "other removals" such as land clearing. In this section, data obtained from the Maine Forestry Department, together with data gathered as part of the resurvey, were utilized to analyze the 1970 timber harvest and output of timber products.

Maine has a longer continuous history of timber harvesting than any other major timber-producing state in the country. The first sawmill of record built in Maine was built in 1634; however, it is believed that one was built before that, in 1623. Maine dominated the lumber industry during the colonial period, but by 1839 New York took over the lead. Nonetheless, Maine remained one of the top five lumber-producing states until 1869,

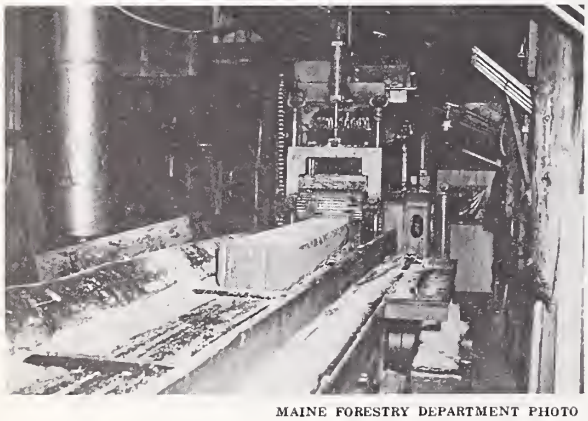
Logger's boots and a peavey—symbols of a trade.

GREAT NORTHERN PAPER COMPANY PHOTO

A load of hardwood sawlogs heads for the mill.

MAINE FORESTRY DEPARTMENT PHOTO

Lumber comes off a sash-gang sawmill.



MAINE FORESTRY DEPARTMENT PHOTO

Making rustic fencing from northern white-cedar.

MAINE FORESTRY DEPARTMENT PHOTO

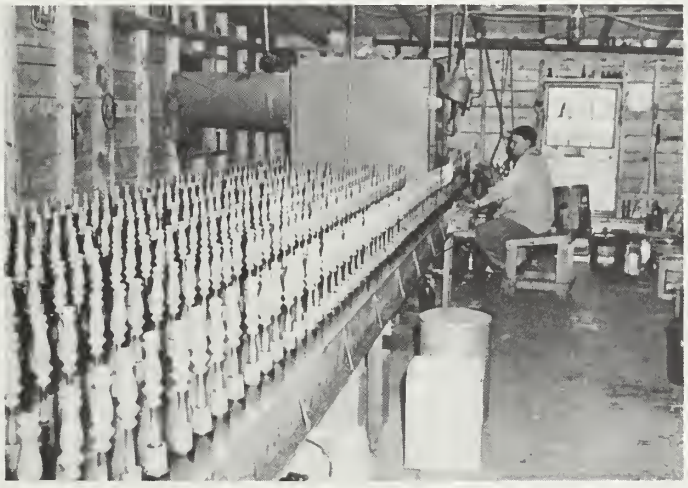
A bolt's eye view of the pulpmill.

GREAT NORTHERN PAPER COMPANY PHOTO

A load of pallets bound for Connecticut.

MAINE FORESTRY DEPARTMENT PHOTO

Finishing turned spindles.



MAINE FORESTRY DEPARTMENT PHOTO

A cooper finishes a barrel made of white-cedar.

MAINE FORESTRY DEPARTMENT PHOTO

A naturally seeded balsam fir cultured for a Christmas tree.

MAINE FORESTRY DEPARTMENT PHOTO

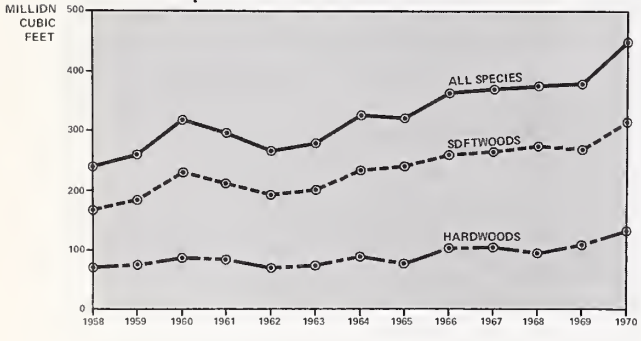
Coat hanger blanks ready for shipment to the manufacturer.

MAINE FORESTRY DEPARTMENT PHOTO

when logging had moved into the Lake States. In 1946 the production of lumber in Maine exceeded that in each of the five states—Michigan, Pennsylvania, New York, Wisconsin, and Indiana—that had bested it in 1869. Many other states have had their brief heyday of timber production, but Maine has kept on producing a steady stream of timber products for over 250 years.

The production of timber products in Maine reached a low point during the depression, but since then it has increased steadily. In 1958 the total production of timber products in Maine stood at 243 million cubic feet; by 1970 production was up to 437 million. This represents an increase of about 80 percent over the 1958 production. Timber production showed a generally steady increase from 1958 to 1970 for softwoods, hardwoods, and for both combined.

The production of timber products in Maine, 1958-70.

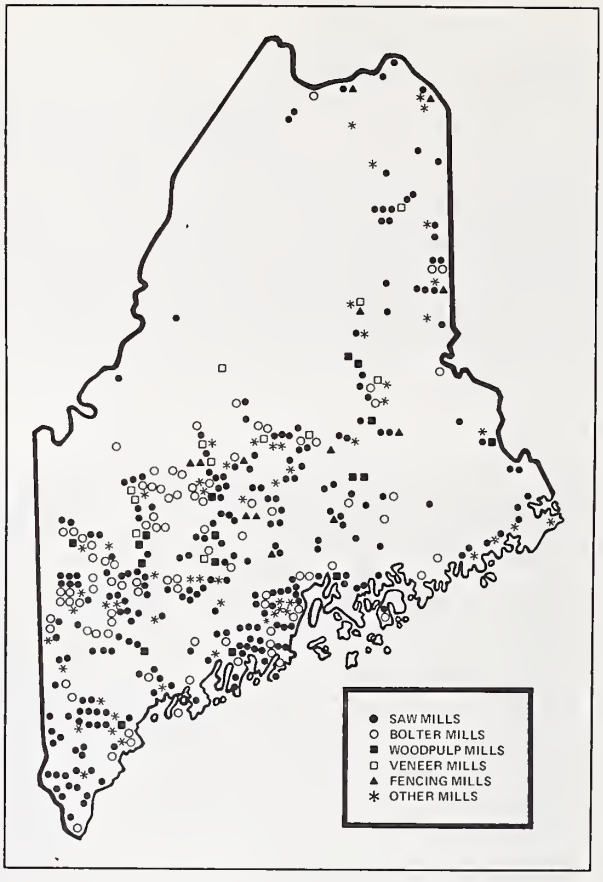


In 1970 approximately 426 primary wood-using plants were in operation in Maine. These included sawmills, bolter mills, woodpulp mills, veneer and plywood plants, fencing manufacturers, and a variety of other plants. Most wood-processing plants in Maine are small locally owned businesses.

PULPWOOD

In 1970 almost 3,221,000 cords of pulpwood were harvested from Maine forests. An additional volume equivalent to 248,000 cords was produced in the form of chipped sawmill slabs and edgings. Both forms of pulpwood — roundwood and pulp chips — totaled 3,469,000 cords in 1970. This is more than double that for 1958.

Distribution of primary wood-processing plants, 1970.

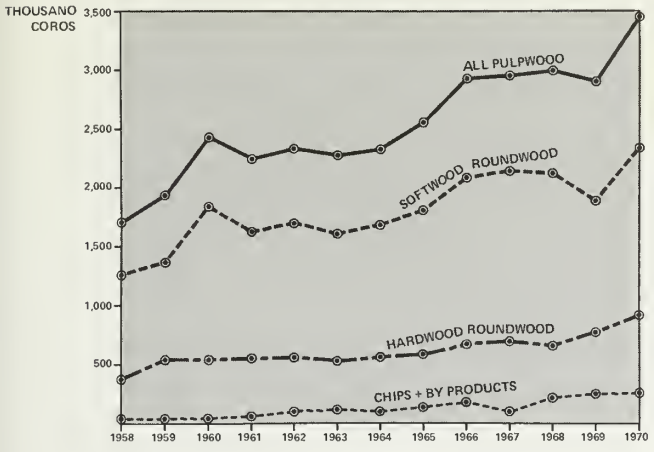


Pulpwood is Maine's most important timber product. Of the 408 million cubic feet of wood harvested in 1970, 274 million cubic feet, or 67 percent, was pulpwood. The volume harvested for pulpwood was two and one-half times the volume harvested for sawlogs.

The 17 woodpulp mills in Maine received a total of 3.4 million cords of roundwood in 1970. Of this total, 3.1 million cords came from Maine and 337 thousand cords was shipped in from other states and provinces. A total of 111 thousand cords harvested in Maine was shipped to woodpulp mills outside the State.

Aroostook County leads the geographic units in the harvest of pulpwood with 706 thousand cords, or nearly 22 percent of the total harvest in 1970. Although Aroostook County leads the State in the total harvest

The trend of pulpwood production in Maine, 1958-70.



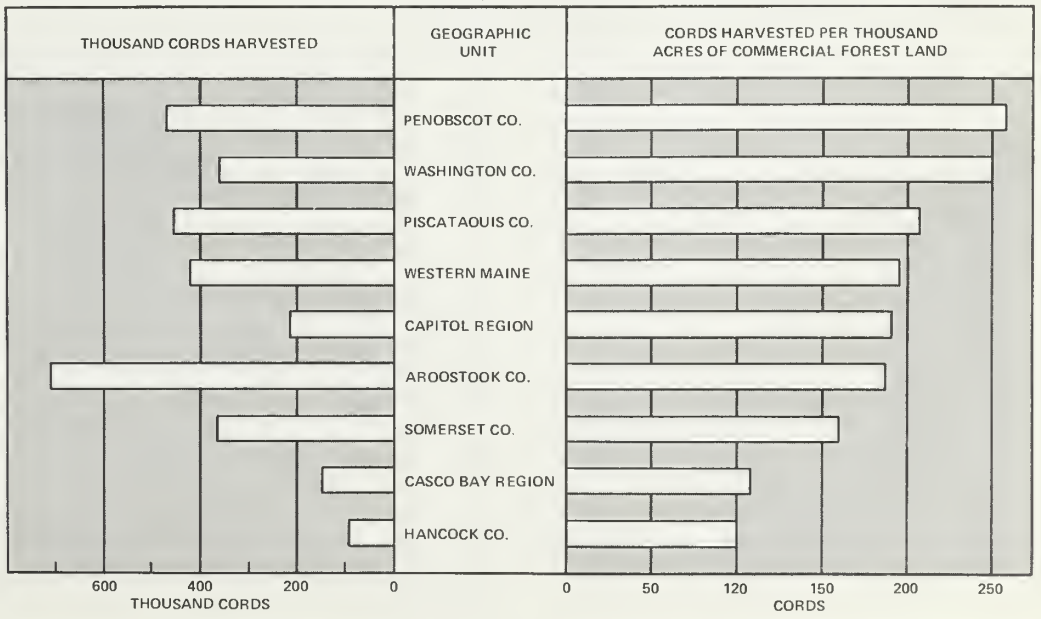
of pulpwood, a comparison of the 1970 pulpwood harvest per 1,000 acres of commercial forest land in each unit puts Aroostook County's lead in perspective. Of the nine geographic units in Maine, five harvested more pulpwood per thousand acres of commercial forest land than did Aroostook County. In fact, Aroostook County's harvest of 188.5 cords per thousand acres is slightly below the statewide average of 190.7 cords per thousand acres.

Since 1958 the volume of pulpwood chips has risen, almost without interruption, from only 35 thousand cords. Slabs and edgings, formerly a residue left from the manufacture of lumber, have become an additional source of income to sawmill operators, and they have made possible the closer utilization of the timber resource. In recent years some chipping plants have begun to chip limbs and tops of trees harvested for sawlogs. This also increases the proportion of each tree harvested that is recovered as usable wood.

Softwood species accounted for over 72 percent of the round pulpwood produced in Maine in 1970. Spruce and fir were by far the leading species. About 59 percent of the pulpwood harvested in 1970 was spruce and fir. Hemlock, white pine, and tamarack made up the remaining 13 percent.

Hardwood species accounted for 28 percent of the round pulpwood harvest in both 1958 and 1970. The percentage of hardwood has varied from a low of 22 to 30 percent of the total harvest in the intervening years. The factors that limit the use of hardwood are the pulping processes used by Maine pulpmills and the final product of the paper mills. As existing mills are modernized and new ones are constructed, we can expect changes in the pulping processes used and the paper products manufactured, which will favor greater utilization of the hardwood species.

Although Aroostook County ranks first in total cords of pulpwood harvested, it ranks sixth in cords per acre harvested.

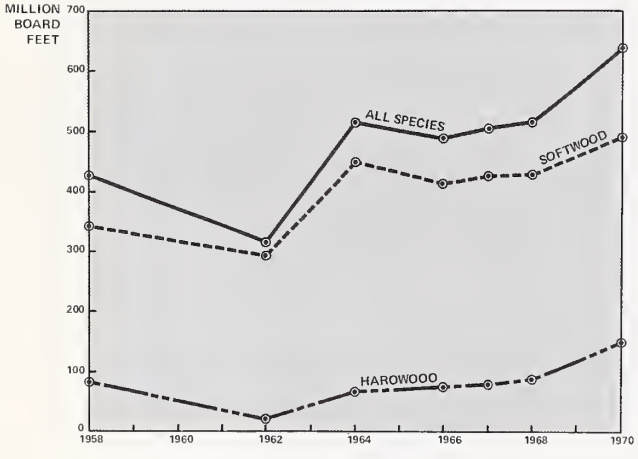


LUMBER AND SAWLOGS

Lumber production in Maine reached a record high of 1.1 billion board feet in 1909 but declined steadily to its record low of 200 million board feet in 1932. Since 1932 the production of lumber in Maine has been on the increase. By 1953 lumber production was up to 589 million board feet.

In 1958 Maine harvested 424 million board feet of sawlogs (the raw material for the lumber industry). Since 1958 the harvest of sawlogs has risen nearly 50 percent to 634 million board feet in 1970. Approximately 250 million board feet of the Maine sawlog harvest of 1970 were shipped to Canada and neighboring states for milling.

Sawlog production in Maine, selected years, 1958-70.



In 1970 Maine had fewer sawmills—235—but they were larger on average than the 669 mills that operated in 1958. In 1970 the average sawmill in Maine produced about 1.8 million board feet of lumber compared with 600 thousand in 1958.

Softwoods accounted for about 77 percent of Maine's sawlog harvest in 1970. Spruce, white pine, and balsam fir accounted for 29, 22, and 13 percent of the total sawlog harvest respectively. Sugar maple, which led the hardwood species, accounted for 10 percent of the total. Together these four species accounted for over 74 percent of Maine's 1970 sawlog harvest.

By geographic units, Aroostook County was the largest producer of sawlogs. About 28 percent of Maine's sawlogs and 31 percent of its softwood sawlogs were harvested in Aroostook County. Piscataquis County, the State's second largest producer of sawlogs, accounted for 19 percent of the softwood, followed by the Western Maine Unit with 11 percent. Western Maine led in the harvest of hardwood sawlogs with nearly 26 percent of the State's total.

VENEER LOGS AND BOLTS

Nearly 37 million board feet of veneer logs and bolts were harvested from Maine's forests in 1970, down from 48.5 million board feet in 1969. Fluctuation has been a characteristic of this industry during the 1958-70 period. In 1958 the harvest of veneer logs and bolts was 43 million board feet. By 1963 it had risen to 51.3 million board feet; in 1968 it dropped to 49.7 million.

Nearly all the wood used in Maine's veneer industry is hardwood. The principal species used are white birch, sugar (hard) maple, and yellow birch. White oak, aspen, basswood, beech, and some white pine are also used.

Twelve veneer plants, owned by 10 companies, were operating in 1970. Three plants produced hardwood plywood, one produced face or panel veneers, and the other eight produced specialty veneers. Specialty veneers is the name given to a vast array of products produced from veneers that are neither containers nor plywood products. Many of these are products stamped with cutting dyes from sheets of hardwood veneer. These include such items as tongue depressors, tooth picks, and wooden forks and spoons. Maine has more specialty veneer plants than any other state in the Nation.

TURNERY BOLTS

The wood-turning industry, with 38 plants in 1970, is very active in the State. In 1958 this industry consumed 41.9 million board feet, and in 1970 it consumed 44.5. Turneries produce such products as dowels, furniture parts, brush handles, thread spools, textile bobbins, billiard cues, and ladies shoe heels—to name just a few of their products. The principal species used is white birch. Yellow birch, sugar maple, aspen, and beech are also important.

Trees of suitable quality and species for turnery bolts are often harvested with sawlogs or pulpwood and then resold to the turneries because they bring higher prices as turnery bolts than as either sawlogs or pulpwood. For this reason the production of turnery bolts is not shown as a separate item in table 26 and other tables.

The bolts are sawed into blanks at bolter mills. A bolter mill is a small sawmill equipped to saw logs up to 8 feet in length. In 1970 there were 93 bolter mills in Maine, compared to 131 in 1958. Not all bolter mills supply the turning industry. Many produce furniture and novelty squares, lobster-trap stock, pallet stock, box boards, and the like.

OTHER INDUSTRIAL TIMBER PRODUCTS

Four products—sawlogs, pulpwood, veneer logs and bolts, and turnery bolts—accounted for 95 percent of the wood harvested in Maine in 1970. The remaining 5 percent went into such products as cooperage logs and bolts, posts, poles, piling, fuelwood, and others too numerous to mention.

The cooperage industry in Maine is declining. In 1958 the consumption of cooperage logs and bolts was 1,633 thousand board feet. By 1970 consumption had dropped to 545 thousand feet. Maine's cooperage industry uses more softwood than hardwood; about 330 thousand board feet were used in 1970. The cooperage industry in Maine makes slack cooperage, mainly barrels and tubs for potatoes, fish, and lobsters. Some manufacture cooperage novelties such as wooden sand pails and furniture.

The rustic-fence industry has shown substantial growth over the past 13 years. In 1958 this industry consumed 7.9 million board feet of northern white-cedar harvested from Maine forests. In 1970 consumption of Maine's white-cedar stood at 24.4 million board feet—up 300 percent. The estimates of fence-post production in table 26 also reflects the growth of this industry. In 1970 Maine produced 648 thousand posts, almost all softwood; and nearly all of this was northern white-cedar, compared with 123 thousand posts that were produced in 1958.

FUELWOOD

In 1970 fuelwood production totaled 324 thousand cords, compared with 264 thousand in 1958. Of this total, 105 thousand cords were produced from wood-industry residues like sawmill slabs and edgings and 29 thousand cords came from dead trees, rough trees, rotten trees, tops, shade trees, and other nongrowing-stock material. Thus only 190 thousand cords (or less than 59 percent of the total fuelwood production) came from growing stock that was harvested for fuelwood.

In recent years the role of fuelwood has changed from a necessity to a luxury. Fuelwood was once an important heating fuel, particularly in rural areas, but more and more fuelwood today is used in fireplaces and stoves for its pleasant effect rather than for its heat value. This trend may account for the increase in fuelwood production.

THE ECONOMIC IMPORTANCE OF MAINE'S TIMBER RESOURCE

Based on average prices for species and products, the total stumpage value of the 1970 timber harvest from Maine's forests amounted to nearly $27 million. Stumpage value is the value of standing timber before harvesting. After harvesting and delivery to primary wood processing plants such as sawmills, woodpulp mills, and veneer mills, this timber was worth $118 million.

A common measure of the economic impact of raw material is value added in manufacture. Value added is the difference between the cost of goods and services purchased by a manufacturer and the value of the products sold. It is value added that provides the money for wages, salaries, profits, taxes, and the like. Value added can be broken down as being attributable to each of the component goods used in the manufacture of a final product. For instance, only part of the value of an upholstered chair is attributable to wood, other portions are attributable to textiles, metals, finishes, fuel, electric power, and packaging.

By means of value added that is attributed to timber, it is possible to estimate the economic impact on Maine's economy of the $27 million dollars worth of stumpage harvested in 1970. Value added attributed to timber for the major steps between the stumpage and the final consumer were calculated for Maine in 1958 by Hair *(3)*. Although these estimates are now 13 years old, in all probability the ratios between them have changed little over the years. By applying these ratios

we can estimate that the timber harvested in 1970 as final products was worth $413 million to Maine's economy. Taking this increase step by step, harvesting added $46 million. Primary manufacturing—converting logs and bolts into lumber, pulp, veneer, and similar products — added $201 million. Secondary manufacturing — remanufacture into finished goods—added $59 million. Construction added $41 million, and transportation and marketing added $39 million.

These values added were added in Maine only. Some of the timber harvested and some of the primary products produced in Maine are shipped to other states or to Canada for manufacturing into final products. The value added to these intermediate products in these other states or provinces appears as value attributable for them, even though the timber originally came from Maine. For instance, Massachusetts has a value added attributed to timber that is twice as high as for Maine, even though Maine harvests about 17 times more timber than Massachusetts. This is because the timber-base industrial activity of Massachusetts is concentrated in secondary industries that manufacture such final products as furniture, homes, paper boxes, and so forth.

In 1970 the total value of all manufactured products produced in Maine was nearly $2.5 billion *(5)*. The two major timber-based industries of the State accounted for $929 million, or 38 percent of the total. The paper and allied products industry is the largest manufacturing industry in Maine. In 1970 its total product value stood at $714 million. Lumber and wood products ranked fourth, with a total product value of $215 million.

(Paper and Allied Products is U.S. Bureau of the Census Standard Industrial Classification (SIC-26); it includes pulpmills, papermills, paperboard mills, and paper fabricators. Lumber and Wood Products (SIC-24) includes logging camps and contractors, sawmills and planing mills, veneer and plywood, cooperage, millwork, and other wood products except furniture.)

One of every four people employed in manufacturing in Maine in 1970 was employed in the timber-based industries. These people received gross wages totaling $201 million dollars, or nearly 30 percent of the State's manufacturing payroll.

The value and importance of only one product of Maine's forests—timber—has been presented. The value of the other products is very difficult to quantify in terms of dollars. If it were possible to quantify and add the values of water supply and its quality, wildlife, recreation, and scenery to the value of timber and the timber-based industries there is little doubt that the total would be staggering. It is small wonder that Maine's forests have been called her most valuable natural resource.

HOW MUCH TIMBER COULD BE HARVESTED?

The primary objective of the forest survey of Maine was to measure the volume, condition, composition, rate of growth and removals, and extent of Maine's timber resources. No attempt has been made to determine the volume of timber that can be bought or sold on the open market.

In 1970 the total net annual growth of growing stock in Maine was 711 million cubic feet. The volume of growing stock removed was 409 million cubic feet. This leaves a difference of 302 million cubic feet of growth over removals. This difference is often thought of as the volume of additional timber that could be harvested annually without detriment .to the growing-stock base. But the actual volume that could be harvested statewide is usually much less than this difference, for a variety of reasons.

When the volume of growth over removals is examined, we find that many factors tend to limit the volume of timber that may be bought or sold. Forest-industry lands grow about 383 million cubic feet per year. Even though forest industries from time to time sell some of their timber on the open market, it is usually available only to the industrial owner. By virtue of the fact that he owns the land, the industrial owner always has first call for the timber on his lands.

Another 315 million cubic feet of growth is in farmer and miscellaneous private ownerships. Many of these owners may be unwilling to sell timber under any circumstances. Others may be unwilling to sell at current market prices, or they may set conditions on harvesting that would make harvesting unprofitable.

Several studies have been undertaken to determine the attitudes of private forest own-

ers and their willingness to harvest timber. Miller and Canham *(6)* found that in New York State 27 percent of the owners were unwilling to harvest timber. In the Georgia Piedmont Region, Holemo and Dyson *(4)*, found that the owners of 34 percent of the region's forest land were unwilling to harvest timber. In a study of forest land owners in the Upper Peninsula of Michigan, Robert N. Stone (unpublished doctoral thesis, University of Minnesota, 1969) concluded that private nonindustry forest land owners indicated timber production as a primary objective for owning forest land only 28 percent of the time. Yet, in spite of this, these ownerships yielded a high proportion of the timber harvest.

A somewhat similar situation may also exist in Maine, as indicated in table 21. It is often said that many private nonindustry landowners in Maine are not interested in timber production, and some are opposed to timber harvesting. Yet private nonindustry forest lands accounted for 44 percent of the annual net growth in 1970, but they accounted for 52 percent of the timber removals. If in fact some ownerships are excluded from harvesting by owner attitude, the remaining ownerships are being harvested more intensively than table 21 would indicate. This also indicates that the conclusions reached by Stone in Michigan may also apply to Maine. Although none of the studies discussed above pertains specifically to Maine, they clearly indicate that the attitudes of forest landowners can strongly influence how much timber could be harvested.

A substantial volume of growing stock may be unharvestable for economic reasons. Areas with too little volume per acre, stands that are too far from market, or too wet, or too steep, cannot be harvested profitably. On other areas the timber may be too small to be marketable, or the timber may be predominantly of a species or quality that is unsalable.

Forest-management policies also influence the volume of timber that may be harvested. In many instances forest managers may put off harvesting timber in order to build up the stocking of the stands. In other cases the management objective may be to produce quality sawlogs, so salable timber may be withheld from the market while it increases in both size and quality. In some cases more timber may be made available than is being grown annually on an area because a management need is to reduce the stocking per acre to the optimum level or because of a need to alter the species composition of the area.

The tables in the appendix of this report provide a guide for those who wish to locate timber supplies. They do not, nor can they, answer the question: How much timber can be bought or sold at current prices? Taken together, the appendix tables can serve to point out areas where timber may be available, and that may warrant further investigation by the prospective buyer.

More Than Wood

This report is concerned primarily with Maine's forests as a supplier of wood and fiber. But these forests provide much more than wood.

WATER

Though forests themselves do not supply water, they do have a profound effect on what happens to the water that falls on them. The forest cover intercepts the rainfall and cushions the impact of falling rain on the soil. Tree litter on the forest floor decomposes to form humus, which, as well as returning nutrients to the soil and providing a growth medium for thousands of plants and animals, acts like a sponge to absorb water and prevent excessive runoff. Tree roots increase the porosity of the soil and permit water to penetrate more readily.

The map of Maine attests to the fact that the State is amply endowed with water. Lakes and ponds linked by numerous rivers and streams are everywhere. But, were it not for the existence of a healthy viable forest cover, these same lakes and streams could easily flood and cause millions of dollars of damage. Each year over 19 billion gallons of water in the form of rain and snow fall on the State of Maine. It is in large part the forests that keep the State's streams and lakes full most of the year, helping to regulate the flow of the precipitation once it is on the ground.

RECREATION

Recreation is big business in Maine. The Maine Department of Economic Development estimates that recreation is a $450-million industry. The vast forests of Maine have always played a major part in attracting recreationists. It is estimated that in 1970 over 1.7 million people visited Maine State Parks, most of which boast a forest atmosphere. These 1.7 million represent only a fraction of the total who sought recreation in Maine's forests. Many more visited commercial camping areas or the campsites maintained by many of the large landowners. Also many visited the 193 campsites maintained by the Maine Forestry Department in the unorganized townships. We have no count of the thousands who visited lodges and hotels or who just toured through the State enjoying the scenery.

With so many forested lakes and streams, it is not difficult to see why canoeing has become such a popular pastime in Maine. Each year thousands travel the State's waterways. In 1970 an estimated 5,000 persons traveled on the Allagash Wilderness Waterway, one of the most spectacular and popular canoe trips in North America.

WILDLIFE

Wildlife is an important part of the forest community. Maine's forests support about 13 thousand moose. The State's deer herd is estimated at about 250 thousand and black bears number about 7 thousand. In addition the State is well endowed with ruffed grouse (partridge), cottontail rabbits, varying hare (snowshoe rabbits), racoons, beaver, otter, porcupines, and many many others. The State's lakes and streams provide some of the best fresh-water fishing in the East. Landlocked salmon and trout lead the list.

Hunting and fishing are big business in Maine. An estimated 380 thousand people participated in these outdoor sports in 1970. The Maine Department of Fish and Game estimates that hunters and fishermen spend over $43 million annually on licenses, equipment, lodging, meals, and transportation.

Timber production and other uses of the forest have existed side by side in Maine for many years.

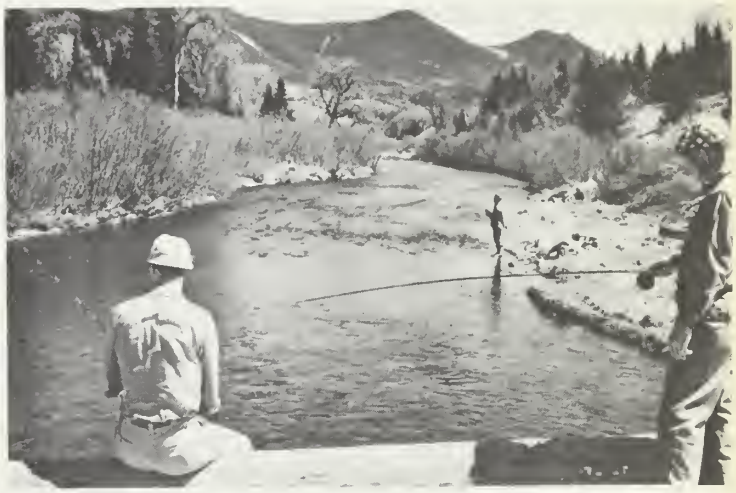
GREAT NORTHERN PAPER COMPANY PHOTO

Maine's Forests Mean Many Things to Different People.

MAINE FORESTRY DEPARTMENT PHOTO

MAINE FISH AND GAME DEPARTMENT PHOTO

GREAT NORTHERN PAPER COMPANY PHOTO



GREAT NORTHERN PAPER COMPANY PHOTO

TIMBER AND THE OTHER USES

The forests of Maine have produced timber products for nearly 250 years; yet at the same time they have become a recreation mecca, have generally prevented erosion and flooding, and have maintained healthy and vigorous wildlife populations. Maine provides an excellent example of many uses and users of the forest existing side by side in general harmony.

Many large landowners welcome recreationists to their lands. Some even provide special recreation maps. All that is asked is that the visitor obey a few rules and at times pay a nominal road-use fee. Many recreationists often think they are in a vast untouched wilderness when in fact they may be camping in an area that has provided three or four timber crops.

Often, when timber is harvested in Maine, some patches are left untouched for deer yards to provide protection and food for deer in the winter months. Logging roads are often seeded to grasses and clover to prevent erosion as well as to provide food for wildlife.

Timber-Supply Outlook

Preceding sections of this report have described the timber-resource situation in Maine as of 1971. They show that the growing-stock inventory has increased 23 percent since 1959 and that timber removals in 1970 were slightly more than 57 percent of annual net growth. But they also show that timber removals have been increasing at a rapid rate and that for several important species in many areas of the State removals either exceeded growth or were extremely close to exceeding growth.

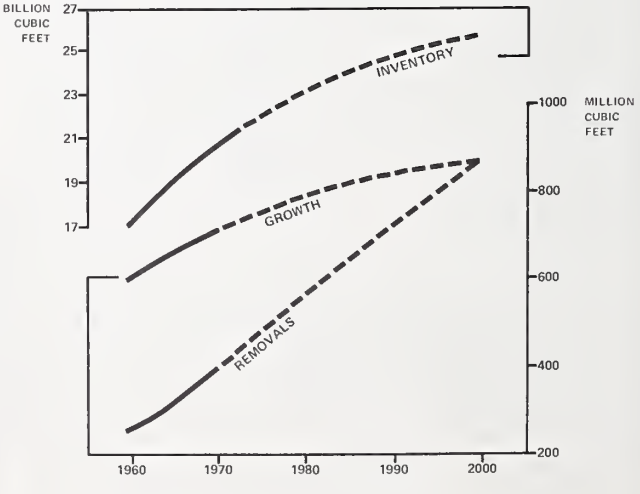
The main question to be answered is: What might be the future timber-supply situation in Maine? In answer to this question, we will present two separate projections, which proceed from different basic assumptions. However, underlying both of these projections are three common assumptions: (1) the total area of commercial forest land in Maine will remain basically unchanged; (2) growth rates based upon the average annual net growth between surveys will hold for the next 30 years; and (3) there will be no major increase in the level of forest management in Maine during the next 30 years.

FIRST PROJECTION: GROWTH EQUALS REMOVALS IN 2000

The first projection is based on the objective that the annual net growth and removal of growing stock will be brought into balance in 30 years. Growth now totals 710.8 million cubic feet per year, and removals total 408.7 million cubic feet. They would come into balance at 860 million cubic feet. Under this projection, the total inventory of growing stock would increase from 21.3 billion cubic feet in 1970 to 25.7 billion in 2000.

For this to be accomplished, the rate at which timber removals has been increasing in recent years will taper off until removals coincide with growth in the year 2000.

First projection: growth equals removals in 2000.



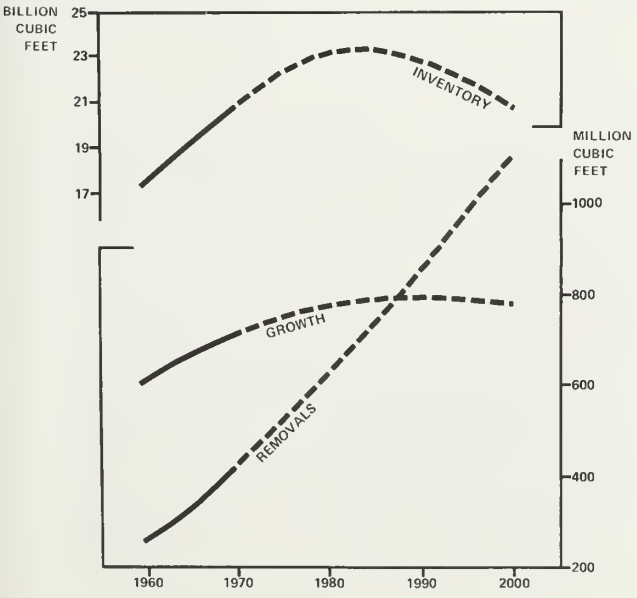
SECOND PROJECTION: REMOVALS FOLLOW 1958-70 TREND

This projection is based on the assumption that the trend of timber removals for 1958-70 will continue through the next 30 years. During the 12-year period between surveys, softwood removals have increased about 4.5 percent per year while hardwood removals have increased about 5.9 percent per year.

Even though present-day timber removals in Maine are only 58 percent of annual net growth, this projection shows that there may be little room for complacency. Under this projection, total removals of growing stock would increase from 408.7 million cubic feet in 1970 to nearly 1.1 billion in the year 2000. Annual net growth would increase only from 710.8 million cubic feet in 1970 to 768 million cubic feet in 2000. At the same time the total growing-stock inventory in the State would decrease from 21.3 billion cubic feet in 1970 to 20.6 billion in 2000. Thus by the year 2000 Maine would find itself in the unenviable position of harvesting about 335 million cubic feet more each year than is grown.

This situation becomes even more serious when hardwoods are examined. If present trends in hardwood removals continue, they will exceed growth by 1973, according to this projection. At the end of the 30-year period, hardwood removals would be nearly three times growth. Overcutting does exist now in many important hardwood species and in certain localities. This is particularly true in western and southern Maine.

Second projection: removals continue on present trend to 2000.



Does this projection mean that the future of Maine's hardwood timber resource is in doubt? The answer to this question depends on several considerations.

First, it seems unlikely that the removals of hardwoods will continue to increase at the 1958-70 rate. A growing scarcity of the commercially important hardwood species will tend to dampen the growth of industries that consume these species.

Second, and perhaps most important, the present hardwood growth rate in Maine is abnormally low at only 2.5 percent of the inventory. The reason for this appears to be the past history of hardwood timber harvesting in Maine. Many hardwood stands in the State have been high-graded repeatedly. That is, only the best-quality timber has been removed. The result is that present hardwood stands in Maine, particularly northern hardwood stands, are heavily stocked with slow-growing, poor-quality trees. So little hardwood timber in Maine is in managed stands that for all practical purposes one can say that generally in Maine hardwoods are not managed. Given active management of Maine's hardwood resource, it appears reasonable to conclude that the average annual growth rate would be raised from the present 2.5 percent to 3.5 and possibly 4 percent. This would, of course, take time and a wide-spread effort at timber management. Thus, it appears conceivable that, through a concentrated effort, Maine could continue to grow more hardwood than is harvested for several years to come. But, in the absence of such an effort, the day when removals exceed growth in hardwoods may not be far off.

Although this projection shows that softwood removals will exceed growth after 1993, the situation here does not seem as potentially serious as in the case of hardwoods. The reasons for this appear to lie mostly in the nature of the two species groups and in the ownership pattern that prevails in each.

The great bulk of the softwood growing stock in Maine is in the northern portion of the State and is held by owners, both industrial and nonindustrial, who have an ac-

tive interest in timber management. Also, the softwoods are typically held in large tracts, which facilitates management. In contrast, the hardwoods in Maine are usually found in small tracts held by owners who often have only a secondary interest in forest management. At present most forest management in the spruce-fir region can be described as extensive rather than intensive. Present demands for softwood are being met with little additional effort in timber management. Given the nature of the owners and the areas that they own, there appears to be little question that, as annual removals of softwood begin to approach annual growth, timber-management activities will be increased and softwood removals will not exceed growth. Such a statement cannot safely be made for hardwoods because of the fragmented nature of the ownerships and because of the past history of timber harvesting on these ownerships.

WHY TIMBER REMOVALS MAY EXCEED GROWTH

An aggregate projection such as this second projection masks many individual problems. Removals in 1970 exceeded growth in several important hardwood and softwood species (table 20). Northern white-cedar, northern red oak, white ash, and yellow birch growing stock and sawtimber were overcut. The removal of yellow birch sawtimber in 1970 was more than 3 times the growth. White pine, sugar maple, and beech sawtimber were also overcut in 1970. The reason that total removals did not exceed growth in 1970 is that the overcutting of these species was offset by the growth of species such as red maple and hemlock, for which only limited markets exist.

A pertinent explanation of why timber removals may exceed growth in Maine, as indicated by the resurvey, is that Maine's forests are producing timber at a rate much below their theoretical potential. Commercial forest land is growing timber at the rate of 42 cubic feet per acre per year. Forest-industry lands average 46 cubic feet per acre per year while farmer and other private lands average 38 cubic feet. Yet, almost 80 percent of the commercial forest land in Maine is theoretically capable of producing over 50 cubic feet per year, and 45 percent is capable of growing 85 cubic feet or more per acre per year.

The reason why growth is so far below its potential in Maine is that many stands have a large proportion of their volume in rough or rotten trees. This is particularly true for the hardwood stands. In fact, 36 percent of all hardwood trees on commercial forest land are either rough or rotten trees (table 11). A look at stocking levels by stand components shows the role of these non-growing-stock trees in reducing growth. When all live trees are considered, 54 percent of Maine's commercial forest land is overstocked. But, when only growing-stock trees are considered, this percentage drops to 16 percent. Overstocked means that there are too many stems per acre to permit maximum growth. Therefore a real need exists to reduce the non-growing-stock component of Maine's timber stands, particularly hardwood stands, so they can produce timber at a rate nearer their potential.

Management Opportunities

The previous section indicated that if present growth and timber-removal trends continue, removals could exceed growth in the foreseeable future. The previous section and earlier sections have pointed to the fact that, for many important species, removals already exceed growth.

The results of this survey show that much of Maine's commercial forest land needs active management. If Maine's timber-based industries are to continue to grow at a rate comparable with recent years, these areas *must* be managed. Management needs appear to be greatest in the southern and western portions of the State, where most of the commercial forest land is held in small tracts by private nonindustry owners.

These areas have often been subjected to a type of harvesting in which only the most marketable trees are harvested and in which little thought — and often no thought — is given to the future composition and condition of the timber stand. Even though the northern portion of the State is generally able to meet the demand for its major forest products, the groundwork for meeting the even greater demands of the future should be laid now.

This white pine stand was selectively logged 8 years ago.

MAINE FORESTRY DEPARTMENT PHOTO

As we have shown throughout this report, Maine's timber-resource situation cannot be described easily in broad terms. Differing stand conditions, ownership needs and desires, markets, and many other factors dictate that management planning is best carried out by technically trained personnel on a stand-by-stand basis. Therefore, we must consider the management of Maine's three most important forest types and the protection of Maine's forest from fire, insects, and diseases from an overall viewpoint. This section on forest management is far from complete. The reader who desires additional information about timber management is directed to the selected bibliography (page 36).

MANAGEMENT OF EASTERN WHITE PINE

Eastern white pine—1.5 billion cubic feet of it—is one of the most important commercial timber species in Maine. Although the white pine forest type covers 11 percent of Maine's commercial forest land, white pine is also an important associate species in the maple-beech-birch and elm-ash-red maple types. White pine is also found in scattered patches throughout the spruce-fir region. White pine is one of the most versatile softwoods in North America.

Quality white pine is always in demand for use in a variety of products from lumber and furniture to patterns and millwork. But the problem in Maine, as in most of the white pine region, is to find quality material. Of the 4.6 billion board feet of white pine growing in Maine, about 88 percent is in grade 3 or poorer sawlogs. White pine grows well in Maine, but rarely does it produce quality timber without cultural treatment. White pine has two characteristics—susceptibility to white-pine weevil and the persistence of dead or dying branches—which are dominant considerations in managing the species. Both of these characteristics require considerable attention to prevent degrading the tree.

Perhaps the best place to begin a discussion of eastern white pine management is

with white pine's worst enemy, the white-pine weevil *(Pissodes strobi)*. This insect attacks and kills the terminal shoot of the tree. The resulting injury seldom causes the death of the tree, but the lateral branches compete for the position formerly held by the terminal shoot or leader. This inevitably produces a crook in the stem, which ultimately lowers log quality. The rapidity with which one lateral shoot asserts its dominance over the others determines the degree of the crook. In many cases, two laterals compete long enough to establish a forked tree. In addition to causing crook, weevil injury also causes a loss in stem length, affecting 2 or 3 years of growth. Lumber defects caused by weevil injury are: cross-grain, red rot, large branch knots, and loose knots. Weevil injury generally reduces board quality by one grade. Occasionally it may cause no degrade; yet in other cases it may cause a reduction of as much as three grades.

There are several techniques for controlling white-pine weevil damage. Chemical sprays can be used safely provided that precautions are observed with applications and dosage and that only properly registered insecticides are used. However, spraying from the ground is expensive and time-consuming, and aerial spraying has not proved successful.

Silvicultural controls of the weevil have been used, but with limited success. Where pine is growing as an understory of a hardwood stand it has been shown that weevil attack can be reduced by maintaining the hardwood overstory until the pine is about 20 feet tall. This method has the drawback that it tends to reduce height growth. However, if the overstory is composed of merchantable hardwoods, this drawback may be acceptable.

Where pine is growing in the open, the best approach seems to be to keep the stands densely stocked until the pine approaches 20 feet in height. This approach does not reduce the incidence of weevil attack; rather it minimizes the effect by forcing the stem to straighten out faster.

When all is said and done, there are some situations in which the forest manager will be forced to the decision of foregoing the expenditure of any major effort at weevil control. This would be true in stands that are beyond 8 feet in height or on poor sites, or in areas in which weevil damage is extremely intensive. The forest manager should weigh the costs of weevil control and its potential success against the possible return on the investment. This can be done only on a stand-by-stand, case-by-case basis.

Because of white pine's characteristic of retaining dead branches for as long as 50 years, successful management of white pine for quality timber must include a program of artificial pruning. Artificial pruning is a costly and time-consuming practice, but it pays off handsomely in quality lumber. In a study at the Pack Forest in New York State, 29 paired trees, one of which was pruned to a two-log height and the other left unpruned, were compared after 16 growing seasons. This comparison showed that, on average, the pruned trees yielded 40 percent select lumber while a comparable unpruned average tree yielded only 11 percent. More important, the retail lumber value of the unpruned tree was $32.43 on average, while the value of pruned trees was $36.98 each, a difference of $4.55 attributable to pruning alone. The cost of pruning was $.43 per tree. This study clearly demonstrates the value of pruning white pine.

Although white pine will grow just about anywhere in Maine where pine seed happens to land, not all areas are capable of producing quality stems. Sites that are very wet or very dry are not good sites. White pine seems to achieve its best development in Maine on light sandy soil with moderate soil moisture —as in southwestern Maine. In addition, the presence of quality pine, as previously described, is a good indication of a good pine site. Because producing quality pine is an expensive and time-consuming job, the forest manager should select the better sites and manage these intensively for quality production rather than attempt less-than-full treatment on all the stands available to him. There are no two ways about it: the production of quality white pine requires constant, long-term attention.

MANAGEMENT OF NORTHERN HARDWOODS

The maple-beech-birch forest type, often called the northern hardwood type, is the most abundant hardwood forest type in Maine. Northern hardwoods cover about 29 percent of Maine's forest land; most of this is in the western portion of the State. It is the northern hardwood type that produces the

more valuable hardwood species such as sugar maple, yellow birch, paper birch, and white ash. This type also enhances the landscape by providing the vibrant autumn foliage and the striking contrast of scattered paper birch.

Most of Maine's northern hardwoods have been managed very little, if at all. Most have been harvested by high-grading methods, which removed only the high-value species or the best-quality trees. Because of these past practices, today's stands contain more beech, red maple, and similar low-value species than if they had been managed.

Northern hardwood stands in Maine, and elsewhere, can be divided into two groups—old-growth stands and second-growth stands. Old-growth stands are typically stands that were heavily harvested about the turn of the century. Since then they have either been left essentially untouched or they have been high-graded. They are typically uneven-aged, slow-growing stands with a wide distribution of diameter classes, and they have as much as one-third of their net volume in rough and rotten trees. Second-growth stands are more or less even-aged areas that have been truly clearcut or heavily high-graded. Most of these stands have a narrow range of diameters. In Maine many second-growth stands are approaching maturity; and because they are likely to be somewhat overstocked, growth rates are lower than they should be.

This then is a description of the present condition of Maine's northern hardwoods. What management practices might be employed to help realize the full potential of this type?

Generally speaking, northern hardwoods on the better sites can be managed to produce large specimens of the most valuable species. In old-growth stands it is often necessary to begin management with a salvage or improvement harvest that would remove 25 to 40 percent of the gross volume of the stand. This harvest would remove any tree that might die before the next harvest, low-quality or poor-vigor trees, less desirable species, multiple-stem trees, and any paper birch or aspen of merchantable size. In sections of the State that have active hardwood pulpwood markets, this harvest can be made profitable by the sale of pulpwood. The paper birch and other suitable species should be sold as turnery bolts if possible in order to realize a higher return.

The importance of frequent harvests or treatments in northern hardwoods, in which the selection system of silviculture is being employed, cannot be overemphasized. It is essential that some tree removal take place at least every 10 to 20 years to maintain optimum stocking for maximum growth of the higher-value trees. These repeated harvests should remove low-value species, rough and rotten trees, and sound mature trees of shorter-lived species such as aspen, birch, or ash. After each harvest the stand should contain, on the average, about 1,900 cubic feet per acre or 80 square feet of basal area.

The selection system favors the very tolerant species such as sugar maple, beech, hemlock, and red spruce. Where adequate markets for these species are available, or where aesthetic considerations are important, the selection system is the preferred method.

However, if birch or ash are present and adequate markets are available, some system of clearcutting, such as clearing small areas or strips, is preferred. Paper birch and white ash are both intolerant species, and both are high-value species. This means that, for these species to be present in the new stand, it is necessary to remove all the overstory competition and expose a mineral soil seedbed in which birch and ash seed can germinate and grow. Normally, small harvested areas should

A clearcut strip designed to regenerate white birch.

be about 1/3 to 2/3 acre in size, and strips should be 50 to 100 feet in width, with an adequate adjacent source of birch or ash seed. Also, it is important that birch should not be exposed on the north and east sides of clearings because this species is sensitive to sudden exposure and the higher soil temperatures that would occur in these locations. In both small and large clearcuttings, it is important to remove or kill all trees, merchantable or unmerchantable, over 2 inches d.b.h.

Considerable thought should be given to the location and size of cleared areas and to the geographical frequency of cleared areas where scenic considerations are important. The layman instinctively reacts negatively when he sees many areas or a large area on which every stem has been removed. Within view of roads where clearcutting is the most productive form of silviculture, signs or displays should be erected that explain the apparent devastation.

Second-growth stands should be managed in a manner similar to that described for old-growth stands where the tolerant species are desired. This requires frequent cleanings and thinnings to develop an uneven-aged stand structure. Where intolerant species are to be regenerated, the stand may be harvested in small clearings, strips, patches, or shelterwood harvests to encourage these species.

The key factors in managing northern hardwoods are to maintain optimum stand density, and thereby to maximize growth on the high-value trees; and to prevent the buildup of low-value species and rough and rotten trees in the stands. Many of the northern hardwood stands in Maine contain far more low-value or low-quality volume than would be acceptable under management. This need not be tolerated in locations with adequate markets for lower-quality material. Many stands could be commercially thinned and cleaned and sold for pulpwood. In many cases these intermediate operations would net the landowner some return on his investment while at the same time they would improve his woodland and increase the value of the remaining stems.

The northern hardwood type under management for timber production can be as pleasant and attractive as unmanaged stands. In fact, in most cases active management will improve appearance by replacing rough and rotten trees and less attractive low-value species with large sugar maples, beeches, or ashes.

MANAGEMENT OF SPRUCE AND FIR

The spruce-fir forest type covers 7.9 million acres of Maine. Most of this area is in the northern half of the State, and much of it is in the more remote sections of the north country.

Spruce and balsam fir, more than any other species, were responsible for the rapid development of the woodpulp industry about the turn of the century. Today these species are still the mainstay of Maine's woodpulp industry. In 1970 about 1.9 million cords of spruce and balsam fir pulpwood were harvested from Maine's forest lands. Of this volume (more than all other species combined), 99 percent was converted into woodpulp in Maine mills.

Spruce lumber has always been an important product of Maine's forests. In all but 4 of the first 25 years of this century, spruce lumber production exceeded the production of white pine lumber. Over the years spruce has been the second most important softwood lumber species in Maine.

The spruce-fir type can be managed successfully under either the uneven-aged or even-aged management regimes. The system chosen will depend upon the objectives of the owner, the accessibility of the area, the labor supply, the available markets, and the site quality.

UNEVEN-AGED MANAGEMENT

Uneven-aged management is best applied to areas with good sites that are accessible, and where the supply of both labor and markets is adequate. Stands that are managed under an uneven-aged system are usually managed for higher-value products such as sawlogs and veneer logs as well as for pulpwood and boltwood.

Spruce and fir are both shade-tolerant species, and they are capable of regenerating under shade. Because of their shade tolerance, the natural growth habit of undisturbed stands in the spruce-fir region is uneven-aged. However, many uneven-aged stands have been converted to even-aged stands because of such natural events as insect attack, severe windstorm, and fire.

In a system of uneven-aged management, stands are thinned and harvested at frequent intervals by single-tree or small-group selection. Uneven-aged management provides for the regeneration of stands through advance regeneration in the form of seedlings on the forest floor. Also, the frequency of harvests under uneven-aged silviculture allows the forest manager better control over the species mix of the stand, and to harvest the shorter-lived balsam fir before it dies. Insect or disease attack is less likely to wipe out stands with a mixture of species and age classes. From the aesthetic viewpoint, stands that are harvested frequently and lightly are generally considered more attractive by the public.

Forest management and harvesting is usually more complicated in uneven-aged stands than in even-aged stands because all operations must be conducted in a mixture of species and age classes. Harvesting operations are expensive because harvests are frequent and light and a large area must be covered to harvest a given volume. Also, it is difficult to utilize modern mechanical harvesting equipment because of the mixture of species and tree sizes. Damage to trees that are not intended for harvest is difficult to avoid, and windthrow of residual trees can also be a problem.

Stands must be scientifically harvested periodically in order to produce timber at their full potential. In this stand usable wood is being lost to insects and diseases as nature makes its own harvest.

The importance of periodic harvests in the uneven-aged system cannot be overemphasized. In accessible areas on better sites, the operating interval should be not more than 15 years; on less accessible or poorer sites, the interval can be extended to 20 or 25 years. Harvesting operations should remove not only the mature trees, but also poor-risk trees, poor-quality (due to vigor, form, or species), and trees that when removed will improve spacing. When only merchantable trees are removed, the productivity and quality of the stand will be lowered.

EVEN-AGED MANAGEMENT

The development of highly mechanized harvesting systems has spurred an interest in even-aged management in the spruce-fir region. At one time even-aged management of spruce-fir was not looked upon as a satisfactory system. However, recent research has shown that it can be a satisfactory system of management for meeting particular objectives in many areas.

In even-aged management, harvesting is concentrated at the end of the rotation. Harvests may take the form of area, patch, or strip clearcuttings or shelterwood harvests. Under these methods the new stand is essentially even-aged. In managed even-aged stands in the spruce-fir region of Maine, one of the clearcutting methods of harvesting can usually be used because most spruce-fir stands have more than enough advance reproduction to adequately stock the new stand. In fact, it is often necessary to thin these new stands at some point during the rotation to maintain optimum stocking for maximum growth.

Like uneven-aged management, even-aged management has its advantages and disadvantages. Many advantages stem from its suitability for highly mechanized logging. With these harvesting systems individual trees do not need to be marked for cutting, and a large volume of wood can be harvested with less labor and at a lower per unit cost

than with other harvesting systems. Many mechanical harvesting systems permit the utilization of a greater portion of each tree harvested than do other systems.

Although even-aged stands are generally considered aesthetically displeasing by the public for a few years after harvesting, these same areas provide excellent wildlife habitat by increasing the amount of available food and cover for wildlife.

Because harvesting and cultural operations may not be as frequent as in uneven-aged management, forest road construction and maintenance is not as large a cost. In large clearcut areas a hot-dry microclimate can develop and reduce seed germination and seedling survival. Depending on the equipment used, some clearcut areas may have large accumulations of slash. These slash accumulations can smother seedlings and create a fire hazard. It should be pointed out, however, that in some mechanized harvesting systems the slash is scattered and presents less of a hazard than in conventional harvesting.

A COMPROMISE

Many forest managers in the spruce-fir region have turned to diameter-limit harvesting as a compromise between the selection and clearcutting systems of harvesting. Under this method all trees over a specified minimum diameter are removed. Diameter limits range from 8 to 15 inches for the spruces and over 6 inches for balsam fir.

Though diameter-limit cutting keeps the cost of harvesting reasonably low and provides a form of partial harvesting that is conducive to future stand development, it has several shortcomings. Diameter-limit harvesting often removes large vigorous trees that might better be left to grow; and small, poor-risk and defective trees of all sizes may be left. In some areas harvesting by the diameter-limit method removes too many trees per acre, while in other areas not enough trees are removed. These drawbacks can be overcome to some extent by careful supervision of harvesting crews and by training crews to exercise judgment in the application of the diameter-limit guides.

This discussion of the principal methods of managing spruce and balsam fir shows that there are several silvicultural alternatives for harvesting and regenerating these species. The forest manager must constantly weigh many economic, biological, and social factors before he decides on the best management program for the area.

Spruce and fir are rarely found in pure stands. Usually they are found in mixture with such hardwood species as red maple and birch and with such softwoods as white pine, hemlock, and northern white-cedar. A major roadblock to more complete management and utilization of the spruce-fir forest is that markets for low-quality hardwoods are virtually nonexistent in many sections of northern Maine. Most of the pulpmills in Maine that can use hardwoods are in the southern half of the State. These mills have ample supplies of low-quality hardwoods within a reasonable hauling distance of the mill. Because of hauling costs, hardwoods from northern Maine cannot compete with this local wood. The establishment of a kraft process woodpulp mill in northern Maine that would depend primarily on the lower-quality hardwoods would be a significant step toward more complete management and utilization of the timber resources in the spruce-fir region.

FOREST PROTECTION

An essential ingredient of successful management is the protection of the forest from fire, insects, and disease.

FIRE PROTECTION

The Maine Forestry Department has the primary responsibility for protecting Maine's 17.7 million acres of forest land from fire. The magnitude of this job can be seen from the fact that in the fiscal year ended 30 June 1970, the Department spent $1,943,389 or 65 percent of its total expenditures for fire control *(7)*.

To provide adequate forest-fire control, the State has been divided into two different organizational districts, one covering the unorganized townships and one covering the organized towns. The Maine Forestry District (MFD), created in 1909, is composed primarily of the unorganized townships in the northern portion of the State. This district consists of an area of about 10 million acres of forest land. The owners of forest land in the Maine Forestry District provide three-fourths of the cost of fire protection through a tax on their property. The remaining fourth

comes from the Federal grant-in-aid programs. The Maine Forestry District is divided into three divisions—Northern, Eastern, and Western. Each division is headed by a District Ranger who is responsible for all fire control in his district.

The organized towns include 7 million acres divided into seven fire-control districts. Each district is further subdivided into units. Each district is headed by a District Ranger and each unit by a Unit Ranger. In the organized towns the town fire warden has the primary responsibility for fire control in his town. The duties of the State personnel are to maintain the watchman's towers and to assist the town fire warden in an advisory and training capacity. State personnel take over suppression operations only when requested by the town warden, or when several towns are involved. Funds for fire control in the organized towns come from legislative appropriations and Federal matching funds.

Through this dual system the State of Maine has compiled an impressive record of fire control. The following table shows that since 1910 the number of forest fires per year in Maine has generally increased, but the average size of the fires has declined from 205 acres during the 1910-19 decade to 8 acres during the 1960-69 decade.

Decade	*Number of fires*	*Total acres burned*	*Average acres burned per fire*
1910-1919	1,121	229,784	205
1920-1929	1,744	275,251	158
1930-1939	2,516	282,360	112
1940-1949	4,552	337,942	74
1950-1959	5,903	107,631	18
1960-1969	5,292	42,227	8

In 1970 there were 430 forest fires in Maine, and a total of 1,011 acres were burned. Of the 430 fires, all but 17 percent were caused by human carelessness or incendiarism. The most common cause of fire was debris-burning, followed by lightning. The cause of the fires in 1970 are shown as follows, and this distribution is typical for most years:

Cause	*Number of fires*	*Percent of total*
Debris-burning	99	23
Lightning	73	17
Smoking	60	14
Incendiary	52	12
Children	44	10
Miscellaneous	33	8
Railroads	27	6
Camp fires	26	6
Machine use	16	4
Total	430	100

INSECT AND DISEASE PROTECTION

The Division of Entomology and Pathology of the Maine Forestry Department has overall responsibility for protection from and control of insect and disease pests of the State's forest and shade trees. To fulfill its responsibilities, the Division requires 16 percent of the Department's budget to mount a five-pronged attack on the State's insect-and-disease problems, consisting of:

1. Detection and assessment surveys
2. Research
3. Control measures, including: cultural, biological, chemical, and mechanical
4. Public education
5. Municipal shade-tree programs

Spruce budworm remains the State's No. 1 insect problem. This insect has caused extensive mortality of balsam fir and spruce in Maine since 1910. During the period 1910 to 1919, spruce budworm killed 27.5 million cords of spruce and fir. In recent years the destruction by budworms has been kept within bounds by aerial spraying.

Another constant problem is the white pine blister rust. To keep the rust under control, the State, in cooperation with the towns and the Federal Government, conducts surveys to detect Ribes plants, the intermediate host, and to eradicate them. White-pine weevil, an insect pest of white pine, has been discussed under white pine management. This pest also presents a constant threat to white pine.

Maine, like many of its sister states, is experiencing extensive losses of magnificent street and shade-tree elms from the Dutch elm disease. Since 1955 state technical and financial efforts, cooperatively with municipalities, have increased and have partially controlled the disease through sanitation programs. Successful containment of the disease is dependent upon the degree of commitment by each municipality.

The four insect and disease problems discussed above are only a fraction of the total list of insects and diseases that require control in Maine. To discuss each of them would fill many pages.

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Appendix

DEFINITION OF TERMS

Land Area Classes

Land area.—(a) Bureau of the Census. The area of dry land and land that is temporarily or partly covered by water, such as marshes, swamps, and river flood plains; streams, sloughs, estuaries, and canals that are less than ⅛ statute mile in width; and lakes, reservoirs, and ponds that are less than 40 acres in area. (b) Forest Survey. The same as the Bureau of the Census, except that the minimum width of streams, etc., is 120 feet, and the minimum size of lakes, etc., is 1 acre.

Forest land.—Land that is at least 16.7 percent stocked (contains at least 7.5 square feet of basal area) by forest trees of any size, or that formerly had such tree cover and is not currently developed for nonforest use. (Forest trees are woody plants that have a well-developed stem and usually are more than 12 feet in height at maturity.) The minimum area for classification of forest land is 1 acre.

Commercial forest land.—Forest land that is producing or capable of producing crops of industrial wood (more than 20 cubic feet per acre per year) and is not withdrawn from timber utilization. (Industrial wood: all roundwood products except fuelwood.)

Noncommercial forest land.—Forest land that is incapable of yielding timber crops because of adverse site conditions (unproductive forest land), and productive forest land that is withdrawn from commercial timber use (productive-reserved forest land).

Productive-reserved forest land.—Forest land that is sufficiently productive to qualify as commercial forest land, but is withdrawn from timber utilization through statute, administrative designation, or exclusive use for Christmas-tree production.

Unproductive forest land.—Forest land that is incapable of producing 20 cubic feet per acre of industrial wood under natural conditions, because of adverse site conditions.

Nonforest land.—Land that has never supported forests, and land formerly forested but now in nonforest use such as for crops, improved pasture, residential areas, and the like.

Unorganized territory or towns (Maine).—An area that does not have any form of organized local government and still is a minor civil division.

Ownership Classes

National Forest.—Federal lands that have been legally designated as National Forests or purchase units and other lands that are under the administration of the Forest Service.

Other Federal.—Lands (other than National Forests) that are administered by Federal agencies.

State.—Lands that are owned by the State of Maine or leased to the State for 50 years or more.

County and municipal.—Lands that are owned by counties and local public agencies or municipalities or leased to them for 50 years or more.

Forest industry.—Lands that are owned by companies or individuals operating wood-using plants.

Farmer-owned.—Lands that are owned by farm operators, whether part of the farmstead or not. Excludes land leased by farm operators from nonfarm owners.

Miscellaneous private.—Privately owned lands other than forest-industry and farmer-owned lands.

Stand-size Classes

Stand.—A growth of trees (see definitions under "Tree Classes") on a minimum of 1 acre of forest land that is at least 16.7 percent stocked by forest trees of any size.

Sawtimber stands.—Stands that are at least 16.7 percent stocked with growing-stock trees, with half or more of total stocking in sawtimber or poletimber trees, and with sawtimber stocking at least equal to poletimber stocking.

Poletimber stands.—Stands that are at least 16.7 percent stocked with growing-stock trees of which half or more of this stocking is in poletimber and/or sawtimber trees and with poletimber stocking exceeding that of sawtimber.

Sapling-seedling stands.—Stands that are at least 16.7 percent stocked with growing-stock trees of which more than half of the stocking is saplings and/or seedlings.

Nonstocked areas.—Commercial forest land that is less than 16.7 percent stocked with growing-stock trees.

Stocking Classes

Stocking.—The degree of occupancy of land by trees, measured in terms of basal area of trees in a stand compared to the basal area of trees required to utilize fully the growth potential of the land. The actual stocking at a point was evaluated against a standard of 75 square feet of basal area per acre (see definition of basal area under "Tree Measurement and Volume"). The stocking percentage for a sample plot is derived from the stocking for each of 10 points. Three categories of stocking are used:

All live trees.—These are used in the classification of forest land and forest types.

Growing-stock trees.—These are used in the classification of stand-size classes.

Desirable trees.—These are used in the classification of area-condition classes.

The degree of plot stocking is viewed as a range of values rather than single points. A fully stocked stand lies within the range of 100 to 133 percent of the basal-area standard. An overstocked stand contains more than 133 percent. The range for medium stocking is 60 to 100 percent and for poor stocking is 16.7 to 60 percent of the basal-area standard. Forest land with less than 16.7 percent of the basal-area standard is classed as nonstocked.

Tree Classes

Forest trees.—Woody plants that have a well-developed stem and usually are more than 12 feet in height at maturity.

Commercial species.—Tree species that are presently or prospectively suitable for industrial wood products. Excludes species of typically small size, poor form, or inferior quality, such as hawthorn and sumac.

Growing-stock trees. — Live trees of commercial species that are classified as sawtimber, poletimber, saplings, and seedlings; that is, all live trees of commercial species except rough and rotten trees. (See definitions under "Class of Timber.")

Acceptable trees.—Growing-stock trees of commercial species that meet specified standards of size and quality, but do not qualify as desirable trees.

Desirable trees.—Growing-stock trees of commercial species, (a) that have no serious quality defects that limit present or prospective use for timber products, (b) that are of relatively high vigor, and (c) that contain no pathogens that may result in death or serious deterioration before rotation age.

Rotten trees.—Live trees of commercial species that do not contain at least one 12-foot sawlog or two noncontiguous sawlogs, each 8 feet or longer, now or prospectively, and do not meet regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

Rough trees.—(a) The same as above, except that rough trees do not meet regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees that are of noncommercial species.

Site-Quality Classes

Site class.—A classification of forest land in terms of inherent capacity to grow crops of industrial wood. Classifications are based upon the mean annual growth of growing stock attainable in fully stocked natural stands at culmination of mean annual growth.

Forest Types

Forest type.—A classification of forest land based upon the species forming a plurality of live-tree stocking. The many local forest types in Maine were combined into the following major forest types:

White pine—red pine—hemlock.—Forests in which eastern white pine, red pine, or hemlock, singly or in combination, make up a plurality of the stocking. (Common associates include aspen, birch, and maple.)

Spruce—fir.—Forests in which spruce or balsam fir, singly or in combination, make up a plurality of the stocking. Cedar swamps are also in this type. (Common associates include white-cedar, tamarack, maple, birch, and hemlock.)

Oak and Oak-pine.—(a) *Oak:* Forests in which oaks or hickory, singly or in combination, make up a plurality of the stocking, except where pines make up 25 to 50 percent, in which case the stand would be classified oak-pine. Hickory is seldom present in Maine. (Common associates include elm and maple.) (b) *Oak-pine:* Forests in which hardwoods make up a plurality of the stocking, but in which pines make up 25 to 50 percent of the stocking.

Elm—ash—red maple.—Forests in which elm, ash, or red maple, singly or in combination, make up a plurality of the stocking. (Common associates include beech and basswood.)

Maple—beech—birch. — Forests in which sugar maple beech, or yellow birch, singly or in combination, make up a plurality of the stocking. (Common associates include hemlock, elm, basswood, and white pine.)

Aspen—birch.—Forests in which aspen, balsam poplar, paper birch, or gray birch, singly or in combination, make up a plurality of the stocking. (Common associates include maple and balsam fir.)

Class of Timber

Softwoods. — Coniferous trees that are usually evergreen, having needles or scalelike leaves.

Hardwoods.—Dicotyledonous trees that are usually broad-leaved and deciduous.

Sawtimber trees.—Live trees of commercial species, (a) that are of the following minimum diameters at breast height—softwoods 9.0 inches and hardwoods 11.0 inches, and (b) that contain at least one 12-foot merchantable sawlog and meet regional specifications for freedom from defect.

Poletimber trees.—Live trees of commercial species that meet regional specifications of soundness and form, and are at least 5.0 inches in d.b.h. but are smaller than sawtimber size.

Saplings.—Live trees of commercial species that are 1.0 to 5.0 inches in diameter at breast height and of good form and vigor.

Seedlings.—Live trees of commercial species that are less than 1.0 inches in diameter at breast height and are expected to survive.

Rough and rotten trees.—See definitions under "Tree Classes."

Timber Measurement and Volume

Basal area.—The area in square feet of the cross section at breast height of a single tree, or of all the trees in a stand, usually expressed as square feet of basal area per acre.

Board foot.—A unit of lumber measurement 1 foot long, 1 foot wide, and 1 inch thick, or its equivalent. By forest-survey convention, softwoods less than 9.0 inches d.b.h. and hardwoods less than 11.0 inches d.b.h. do not contain board-foot volume.

Diameter at breast height (d.b.h.).—The diameter outside bark of a standing tree measured at 4½ feet above the ground.

Growing-stock volume.—Net volume, in cubic feet, of live growing-stock trees that are 5.0 inches d.b.h. and over, from a 1-foot stump to a minimum 4.0-inch top diameter outside bark of the central stem,

or to the point where the central stem breaks into limbs. Net volume equals gross volume less deduction for rot.

International ¼-inch rule.—A log rule, or formula, for estimating the board-foot volume of logs. Stated mathematically, the formula is $[\{D^2 \times 0.22\} - 0.71\ D\ ] \times 0.904762$ for 4-foot sections, where D = the diameter inside bark at the small end of the 4-foot section. The International ¼-inch rule is used as the USDA Forest Service standard log rule in the northeastern United States.

Standard cord.—A unit of measure for stacked bolts of wood, encompassing 128 cubic feet of wood, bark, and air space. Cord estimates can be derived from cubic-foot estimates of growing stock by applying an average factor of 80 cubic feet of wood (inside bark) per rough cord; the cubic-foot estimates of volume suitable for pulpwood in Maine can be converted to cords by dividing by an average factor of 85 cubic feet of wood per rough cord in lieu of any other converting factors.

Sawtimber volume.—Net volume in board feet, International ¼-inch rule, of merchantable sawlogs in live sawtimber trees. Net volume equals gross volume less deductions for rot, sweep, and other defects that affect use for lumber.

Sawlog.—A log that meets minimum standards of diameter, length, and defect, including logs at least 8 feet long, and with a minimum diameter inside bark of 6 inches for softwoods and 8 inches for hardwoods. (See specifications under "Log Grade Classification.")

Sawlog portion.—That part of the bole of a sawtimber tree between the stump and the sawlog top (merchantable height).

Sawlog top.—The point on the bole of a sawtimber tree above which a sawlog cannot be produced. The minimum sawlog top is 7.0 inches d.o.b. for softwoods and 9.0 inches d.o.b. for hardwoods.

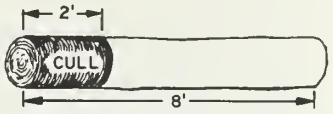
Upper-stem portion.—That part of the main stem or fork of a sawtimber tree above the sawlog top to a diameter of 4.0 inches outside bark or to the point where the main stem or fork breaks into limbs.

Log Grade Classification

Log grades are a classification of logs based on external characteristics as indicators of quality or value. The log-grade standards and grading systems for softwood and hardwood species used in this forest survey of Maine are shown in the following specifications:

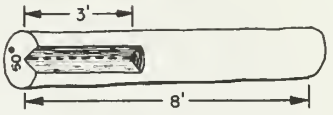
METHODS USED TO DETERMINE SCALING DEDUCTION

(Examples based on an 8-foot log with 20-inch scaling diameter)



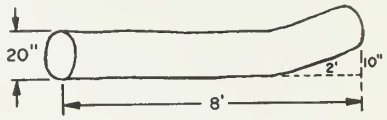
If section of bole is affected, deduct percent of log length affected.

Example $\frac{2}{8}$ = 25 percent cull



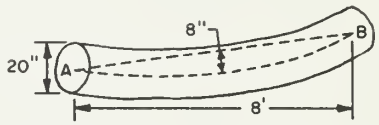
If sector is affected, multiply percent of circle times percent of length.

Example: $\frac{60°}{360°} \times \frac{3}{8}$ = 6 percent cull



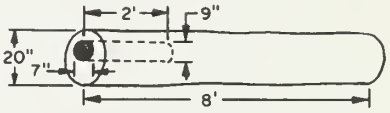
For a crook, multiply proportion of diameter displaced times proportion of log length affected by crook.*

Example: $\frac{10}{20} \times \frac{2}{8}$ = 12 percent board-foot cull



For a sweep, determine sweep departure and subtract 1 inch for 8-foot logs or 2 inches for 16-foot logs. Divide by log diameter.

Example: $\frac{8 - 1}{20}$ = 35 percent board-foot cull**



For interior cull, square out interior cull as a percent of total volume of the section. For board-foot cull, add 1 inch to width and to thickness; for cubic-foot cull, use actual dimensions of rot. For board-foot cull divide width and thickness by the scaling diameter (average d.i.b., small end) minus 1; for cubic-foot cull, divide by scaling diameter. Multiply fractions by percent of log affected.

Example: $\frac{8 \times 10}{20\text{-}1} \times \frac{2}{8}$ = 6 percent cubic-foot cull

* No reduction of cubic-foot volume will be made.

** If a straight line between A and B falls outside the bark, the affected section is over 50 percent cull in board feet.

WHITE PINE LOG GRADES

(Unpublished trial specifications, revised 1963)

Log grade	Minimum size		Defect allowance		Maximum weevil injury	Allowable knot size (inches) on 3 best faces or minimum clearness on 4 faces
	Diameter	Length[1]	Sweep or crook	Total cull including sweep		
	Inches	Feet	Percent	Percent	Number	Inches
No. 1	12 & 13	8–16	20	50	0	4 faces free of knots ½″ or larger full length of log.
	14+	10–16	20	50	0	2 faces free of knots ½″ or larger full length of log, or 4 faces free of knots ½″ or larger 50 percent length of log (6′ minimum length)[2].
No. 2	6+	8–16	30	50	0	Sound red knots $\leqq$[3] D/6 and no larger than 3″. Black knots: Butt logs $\leqq$ D/12 and no larger than 1½″. Upper logs $\leqq$ D/10 and no larger than 1½″. or 4 faces free of knots ½″ or larger 50 percent length of log.
No. 3	6+	8–16	40	50	8′ logs: 1 weevil 10′+ logs: 2 weevils	Sound red knots $\leqq$ D/3 and no larger than 5″. Black knots $\leqq$ D/6 and no larger than 2½″.
No. 4	6+	8–16	50	50	No limit	No limit.

[1] Plus trim.

[2] If the sum of the diameters of sound red knots plus 2X (sum of the diameters of dead or black knots) in inches is $\leqq$ ½ the diameter of the log (in inches).

[3] $\leqq$ means equal to or less than.

SPRUCE, FIR, HEMLOCK, TAMARACK, AND CEDAR LOG GRADE

(Minimum merchantability specifications)

Log grade	Minimum size		Defect allowance		Other requirements
	Diameter[1]	Length[2]	Sweep or crook	Total deduction	
	Inches	Feet	Percent	Percent	
1	10–12	8–16 in 2-foot multiples	25	50	Sound knots not over 2 inches in diameter permitted. Shake permitted up to 20 percent of gross scale if not combined with other serious defects.
	13+	8–16 in 2-foot multiples	25	50	Sound knots not over 3 inches in diameter permitted. Shake permitted up to 20 percent of gross scale if not combined with other serious defects.

[1] At small end of log.

[2] Without trim.

HARDWOOD FACTORY LUMBER LOG-GRADE SPECIFICATIONS

(From U.S. Forest Products Laboratory Report D 1737)

GRADE FACTORS*		SPECIFICATIONS							
		Log Grade 1			Log Grade 2				Log Grade 3
Position in tree		Butts only	Butts & uppers		Butts & uppers				Butts & uppers
Minimum diameter (inches)		13–15[1]	16–19	20+	11[2]		12+		8+
Minimum length (feet)		10+	10+	10+	10+	8–9	10–11	12+	8+
Clear cuttings** on each of the 3 best faces	Min. length (ft.)	7	5	3	3	3	3	3	2
	Max. number	2	2	2	2	2	2	3	—
	Min. yield in face length	5/6	5/6	5/6	2/3	3/4	2/3	2/3	1/2
Max. sweep and crook allowance (percent of gross volume)		15			30				50
Max. cull and sweep allowance (percent of gross volume)		40[3]			50[4]				50

* End defects, although not visible in standing trees, are important in grading cut logs. Instructions for dealing with this factor are contained in Forest Prod. Lab. Rpt. D 1737.

** A clear cutting is a portion of a face free of defects, extending the width of the face. A face is one-fourth the surface of the log as divided lengthwise.

[1] Ash and basswood butts can be 12 inches if otherwise meeting requirements for small No. 1's.

[2] 10-inch logs of all species can be No. 2 if otherwise meeting requirements for small No. 1's.

[3] Otherwise No. 1 logs with 41-50 percent cull can be No. 2.

[4] Otherwise No. 2 logs with 51-60 percent cull can be No. 3.

Source: A Guide to Hardwood Log Grading (pg 11), NE. Forest Exp. Sta., Upper Darby, Pa. 1965.

HARDWOOD CONSTRUCTION LOG SPECIFICATIONS

GRADE FACTORS		SPECIFICATIONS
Position in tree		Butts and uppers
Scaling diameter (inches)		8+
Length, without trim (feet)		8+
Clear cuttings		No requirements: not graded on cutting basis.
Max. sweep allowance		One-fourth d.i.b. of small end for half logs, and one-half d.i.b. for logs 16 feet long.
Sound surface defects permitted	Single knots	Any number, if none has an average collar* diameter that is more than one-third of log diameter at point of occurrence.
	Whorled knots	Any number, provided the sum of the collar diameters does not exceed one-third the log diameter at point of occurrence.
	Holes	Any number not exceeding knot specifications if they do not extend more than 3 inches into the contained tie or timber.
Unsound surface defects permitted**		Any number and size if they do not extend into contained tie or timber. If they extend into contained tie or timber, they shall not exceed size, number, and depth of limits for sound defects.

* Knot collar is the average of the vertical and horizontal diameters of the limb or knot swelling as measured flush with the surface of the log.

** Interior defects are not visible in standing trees. They are considered in grading cut logs. No interior defects are permitted except one shake not more than one-third the width of the contained tie or timber, and one split not more than 5 inches long.

Source: A Guide to Hardwood Log Grading, (pg. 28), NE. Forest Exp. Sta., Upper Darby, Pa. 1965.

Net Annual Growth and Timber Removals

Average annual net growth of growing stock.—The change (resulting from natural causes) in volume of sound wood in sawtimber and poletimber trees during the period between surveys, divided by the length of the period. (Components of annual net growth of growing stock include the increment in net volume of trees present at the beginning of the period and surviving to its end, plus net volume of trees reaching poletimber size during the period, minus the net volume of trees that died during the period, minus the net volume of trees that became rough or rotten trees during the period, cull increment.)

Average annual ingrowth of growing stock.—The net cubic-foot volume of trees now classed as growing stock that were less than 5.0 inches d.b.h. on the initial survey, divided by the length of the period between surveys.

Average annual mortality of growing stock.—The net cubic-foot volume removed from the growing stock because of death from natural causes during the period between surveys, divided by the length of the period between surveys.

Average annual growing-stock removals.—The net cubic-foot volume of growing-stock trees harvested or killed in logging, cultural operations such as timber-stand improvement, land-clearing, or changes in land use during the period between surveys, converted to an annual basis.

Average annual net growth of sawtimber.—The change (resulting from natural causes) in net board-foot volume of sawtimber during the period between surveys, divided by the length of the period. (Components of annual net growth of sawtimber include the increment in net volume of sawtimber trees present at the beginning of the period and surviving to its end, plus the net volume of trees reaching sawtimber size during the period, minus the net volume of sawtimber trees that died during the period, minus the net volume of sawtimber trees that became rough or rotten during the period between surveys, cull increment.)

Average annual ingrowth of sawtimber.—The net board-foot volume of trees now classed as sawtimber that were not tallied as such on the initial survey, divided by the length of the period between surveys.

Average annual mortality of sawtimber.—The net board-foot volume removed from live sawtimber by death from natural causes during the period between surveys, divided by the length of the period between surveys.

Average annual sawtimber removals.—The net board-foot volume of sawtimber trees harvested or killed in logging, cultural operations such as timber-stand improvement, land-clearing, or changes in land use during the period between surveys, converted to an annual basis.

Cull increment.—The net volume of growing-stock trees on the initial inventory that became rough or rotten trees in the second inventory.

Logging residues.—The unused growing-stock volume of trees cut for products and the total growing-stock volume of trees destroyed in the course of logging but not removed for products.

Other removals.—The growing-stock volume of trees that were removed from the inventory and not used for products, by cultural operations (i.e., weeding, thinning, etc.), land-clearing, and reclassification of some commercial forest land as noncommercial forest land.

Plant byproducts.—Wood products, such as slabs, edgings, and veneer cores, that are obtained incidental to the production of timber products and are utilized in the manufacture of other timber products. (Bark is not included.)

Plant residues.—Wood material produced incidental to the production of timber products but not utilized.

Roundwood products.—Logs, bolts, or other round sections cut from growing stock or non-growing stock for industrial or nonindustrial uses.

Timber products.—Roundwood products and plant byproducts from all sources.

Timber removals.—The growing-stock volume of trees removed from the inventory for roundwood products, plus logging residues and other removals.

Annual net growth trend-level.—The estimated growth of growing stock or sawtimber for a specific year that is consistent with the average annual growth during the period between surveys and with the current inventory. (1970 for Maine.)

Annual removals trend-level.—The estimated removals of growing stock or sawtimber for a specific year that is consistent with the trend of removals during the period between surveys and with the current inventory. (1970 for Maine.)

FOREST-SURVEY METHODS

The Northeastern Forest Experiment Station's Forest Survey project used the sampling-with-partial replacement (SPR) design in the re-inventory of Maine's timber resource. With this design, estimates of forest area and timber volume were made by combining a subsample of remeasured plots, a regression updating of the initial inventory, and a new independent photo and ground-plot inventory. Thus the SPR design, by combining two independent estimates of the inventory, yields a better estimate of the timber resource at a given cost.

One estimate is based on the updating of the initial survey (1959). This required the remeasurement of a subsample of the initial inventory ground plots. With the area-change and current-volume estimates obtained from the remeasured sample plots, regression techniques were used to update all the initial ground and photo plots to obtain an independent estimate of current timber volume and forest area.

The second estimate is also based on a large photo-plot sample with a subsample of ground plots. For the second estimate the most recent aerial photography coverage of Maine was used. Photo plots were pinpointed on each photograph to provide a uniformly distributed sample of the area. Each photo plot was examined stereoscopically and classified as either forest or nonforest land. Those

classified as forest land were further stratified into cubic-foot-volume-per-acre classes. A subsample of these photo plots, which was selected to be proportional to the area in a photo class, was measured on the ground. From this ground measurement, estimates of the mean and variance of each photo class were obtained. These means were expanded by photo-strata areas to yield a second independent estimate of forest area and timber volume.

The final estimates of current forest area and timber volume were developed by combining these two independent estimates. The combination process consisted of weighting each estimate by the reciprocal of its variance and then adding them. The associated sampling error for this new estimate was also obtained. These combined totals were partitioned into the various categories of area and volume (e.g., volume by species and d.b.h. class) using the data obtained from the new ground-plot sample.

In addition to estimating current timber volume and forest area, the forest survey of Maine was designed to obtain an estimate of the components of average annual change during the period between the initial and the current inventories. The parameters of interest include area change from forest to nonforest and vice versa, timber growth, timber removals, and timber mortality. All this information was obtained from the remeasured plots. The timber-change parameters were obtained by a tree-by-tree reconciliation of each remeasured plot. The reconciliation code for each remeasured tree was used to make estimates of the parameters of change, by species. The estimates of change were expressed as an average annual figure by dividing the total for the period by the number of years between measurements. These estimates were then used to compute the annual net growth, mortality, and removals for 1970.

Remeasured-Plot Phase

The initial forest inventory of Maine consisted of a large photo-plot sample plus a ground measurement of a subsample of these photo plots. (At the initial survey occasion, the ground plots were selected according to optimum allocation for volume estimation.) The photo plots were stratified according to land use as forest or nonforest. The forest plots were further classified into volume classes. A total of 2,267 ground plots were measured by field crews during this first inventory. These ground samples were 1/5-acre circular plots.

At this second measurement occasion, a sample of 902 of the initial ground plots (including 62 nonforest plots)—selected randomly within each initial photo-plot class—was revisited. These remeasured plots were distributed within the nine geographic units of Maine as follows:

Washington County	60
Aroostook County	211
Penobscot County	98
Hancock County	61
Piscataquis County	130
Capitol Region	55
Somerset County	116
Casco Bay Region	68
Western Maine	103

The plot center was relocated for each remeasured plot. On those plots that were forested, all the trees on the 1/5-acre were tallied. The new tally was reconciled with the initial tally to account for every tree at both occasions.

New Ground-Plot Phase

The source of the new independent estimates of volume and forest area was a new photo stratification with a subsample of ground measurements. The photo sample of Maine consisted of about 36,000 photo points on the latest available aerial photography. A subset of 1,587 of these photo plots, including 159 nonforest plots, was located on the ground. Land use was verified and tree-measurement data were recorded for the 1,428 forest plots. Unlike the initial inventory, in which fixed-radius 1/5-acre plots were tallied, the new ground plots consisted of a cluster of 10 prism points systematically covering approximately 1 acre. At each point, trees were selected for tally by using a prism with a basal-area factor of 37.5. Area-attribute data were also tallied at each of the 10 points.

The new ground plots in Maine were distributed within the geographic strata as follows:

Washington County	157
Aroostook County	360
Penobscot County	172
Hancock County	76
Piscataquis County	187
Capitol Region	118
Somerset County	198
Casco Bay Region	131
Western Maine	188

Data Processing

Field tally data consisting of plot and individual-tree information were processed and compiled into various tables, using FINSYS—Forest Inventory System — on modern, large-capacity, high-speed computers.

FINSYS is a data-processing system consisting primarily of a series of computer programs that was developed by the Northeastern Forest Experiment Station to process and compile a large volume of forest-inventory data. The system consists of an editing subsystem that edits field tally data for errors; a table-compiling subsystem that compiles tables from edited field data; and, finally, an output subsystem that expands the plot data to geographic unit or statewide estimates and prints the final tables.

FINSYS was described in a series of research papers by R. W. Wilson and R. C. Peters in 1967: *The Northeastern Forest Inventory Data Processing System,* USDA Forest Service Research Papers NE-61 and NE-70 to 80.

Before modern computers came into use, the compiling of forest-inventory data was a major bottleneck in forest-inventory work. Using FINSYS, it is possible, as in the case of the resurvey of Maine, to have preliminary estimates available for geographic units within 6 months after the last plot is taken. To process and compile a geographic

unit, from key-punching to the output of tables, requires about 2½ months of elapsed time and about 2½ hours of computer time.

FINSYS has several features that make it unique. One of these is the ability not only to calculate inventory estimates but also to calculate the variance and sampling error for each estimate. This feature provides the user with a measure of the reliability of each statistic and the ability to determine the reliability of a new estimate based upon a data combination he may make.

Another feature of FINSYS is its flexibility. The system is not restricted to the Northeastern forest survey, but can be used for any large-scale forest inventory. Also, the system does not produce a standard set of tables. The individual user specifies the tables to be developed according to his particular need. Thus, at any stage in the data-processing phase or even at a later date, a specific table can be developed with minimum effort.

The data-processing of the resurvey of Maine entailed the preparation and processing of approximately 100,000 data cards. The data from these cards were used to compile more than 50 different tables for each of the nine geographic units in Maine.

County Data

Many users of forest-survey data have shown a need for county information. To provide such information within the framework of the survey design, tables for counties where more than one county makes up a geographic stratum have been developed, based on a survey-unit partitioning technique.

First the survey-unit means and variances for the various photo-plot strata were applied to the photo-plot data for each county within the survey unit. This yielded an estimate of total volume or total commercial forest-land area for each county. Next, the data from all the new ground plots in the unit were used to partition the county totals into their various components. For example, if a table of cubic-foot volume by softwoods and hardwoods is to be made for a county, the estimate of total cubic-foot volume for that county is partitioned into softwood and hardwood totals according to the proportion of softwoods and hardwoods for all new forest-survey ground plots within the unit.

In those units that contain only one county, the county is synonymous with the geographical unit.

Comparisons Between Inventories

After inventories have been completed for several points in time, it is desirable to evaluate the trends between the several inventories and to make comparisons. A comparison of the 1970-71 and the 1958-59 forest-survey estimates of volume, growth, removals, and mortality was made for Maine. A computer program, TRAS (Timber Resource Analysis System), was used.

Since the survey-unit boundaries were different at the first occasion, no direct comparisons of published data can be made between units. Present plans call for the same units to be used for the third inventory as were used for the second inventory so comparisons between units will be possible at that time. The procedure for obtaining county data (see "Forest Survey Methods") was different on the two surveys, so comparisons of area and volume for a county are subject to procedural differences in the estimates as well as to sampling errors.

Because of changes in procedures and in definitions it was necessary to adjust the 1959 inventory-volume estimate to what it would have been had the 1968-70 procedures and definitions been used in 1959. This process involved several calculations and adjustments in the 1959 inventory in order to make it comparable with the 1971 inventory. One important step in this process was to recalculate the 1959 inventory volume, using the average net volume per tree from the resurvey. To do this, the average net volume per tree developed from the resurvey for each 2-inch diameter class was multiplied by the number of trees in each 2-inch diameter class from the 1959 inventory. These calculations resulted in an inventory estimate for 1959 adjusted to 1968-70 standards. These adjusted 1959 volume estimates for Maine are:

- For softwood growing-stock volume, 6.6 percent greater than was reported.
- For hardwood growing stock volume, both the adjusted and reported estimates are the same.
- For softwood sawtimber volume, 5.6 percent lower than reported.
- And for hardwood sawtimber volume, 2.3 percent lower than reported.

It is these adjusted 1959 estimates, not the volume estimates published in the report of the 1959 survey, that are the basis for comparisons between surveys shown in this report.

RELIABILITY OF THE ESTIMATES

The forest-area and timber-volume data presented in this report were based upon a carefully designed sample of forest conditions throughout Maine. However, since neither every acre nor every tree in the State was measured, the data presented in this report are estimates. A measure of the reliability of these estimates is given by a sampling error. An associated sampling error was calculated for each estimate in this report. These appear in the data tables.

Briefly, this is how the sampling error indicates the reliability of an estimate. Our estimate of the total growing-stock volume in Maine—21,253 million cubic feet—has an associated sampling error of 0.9 percent (191 million cubic feet). This means that our best estimate of the total growing-stock volume in Maine in 1971 is 21,253 million cubic feet. If there are no errors in procedure, the odds are 2 to 1 that, if we repeated the survey in the same way, the resulting estimate of growing-stock volume would be between 21,062 million and 21,444 million cubic feet (21,253 ± 191). Similarly, the odds are 19 to 1 that it would be within ± 382 million cubic feet and 300 to 1 that it would be within ± 573 million cubic feet.

The computed sampling error is not a complete measure of reliability. There are other sources of error that this term does not include. There could be imperfections in volume tables and equations and errors in field measurement. Procedural errors were kept to a minimum by careful training of all personnel, frequent inspection of field work, and application of the most reliable survey methods.

Computed sampling errors for the totals shown in the statistical tables are:

	Sampling error (percent)
Commercial forest area: 16.9 million acres	0.4
Growing-stock volume: 21.3 billion cubic feet	.9
Sawtimber volume: 34.5 billion board feet	1.6
Annual net growth: 711 million cubic feet	4.0
Annual removals: 409 million cubic feet	12.0

COMMON COMMERCIAL SPECIES OF MAINE

Names are according to Elbert L. Little, Jr.: *Check list of native and naturalized trees of the United States (including Alaska)*. U. S. Dep. Agr. Handbook 41, 472 pp., 1953.

Softwoods

Eastern white pine	*Pinus strobus*
Red pine (Norway)	*P. resinosa*
Pitch pine	*P. rigida*
Norway spruce	*Picca abies*
White spruce	*P. glauca*
Black spruce	*P. mariana*
Red spruce	*P. rubens*
Balsam fir	*Abies balsamea*
Eastern hemlock	*Tsuga canadensis*
Atlantic white-cedar	*Chamaecyparis thyoides*
Eastern redcedar	*Juniperus virginiana*
Tamarack	*Larix laricina*
Northern white-cedar	*Thuja occidentalis*

Hardwoods

Sugar maple	*Acer saccharum*
Red maple	*A. rubrum*
Silver maple	*A. saccharinum*
American beech	*Fagus grandifolia*
White ash	*Fraxinus americana*
Black ash (brown)	*F. nigra*
Green ash (red)	*F. pennsylvanica*
Yellow birch	*Betula alleghaniensis*
Sweet birch (black)	*B. lenta*
Paper birch (white)	*B. papyrifera*
Gray birch	*B. populifolia*
Quaking aspen (Popple)	*Populus tremuloides*
Bigtooth aspen (Popple)	*P. grandidentata*
Balsam poplar	*P. balsamifera*
White oak	*Quercus alba*
Northern red oak	*Q. rubra*
Black oak	*Q. velutina*
Bur oak	*Q. macrocarpa*
Shagbark hickory	*Carya ovata*
American basswood	*Tilia americana*
Black cherry	*Prunus serotina*
Elm	*Ulmus* species
Othern eastern hardwoods:	
Butternut	*Juglans cinerea*
Eastern hophornbeam (ironwood)	*Ostrya virginiana*
American hornbeam (blue-beech)	*Carpinus caroliniana*

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Table 1.—*Area by land classes, Maine, 1971*

Land class	Area	
	Thousand acres	*Percent*
Forest land:		
Commercial	16,894.3	86
Productive-reserved[1]	220.7	1
Unproductive	633.6	3
Total forest land	17,748.6	90
Nonforest:		
Cropland[2]	894.2	4
Pasture[2]	98.1	1
Other[3]	1,056.2	5
Total nonforest land	2,048.5	10
Total area[4]	19,797.1	100

[1]Includes 31,200 acres in the Acadia National Park, 164, 300 acres in the Baxter State Park, and 11,500 acres in the Allagash Waterway.
[2]Source: 1964 Census of Agriculture.
[3]Includes swampland, industrial and urban areas, other nonforest land, and 97,431 acres, classed as water by Forest Survey standards, but defined by the Bureau of the Census as land.
[4]Source: United States Bureau of the Census, Areas of Maine: 1960. (June 1967).

Table 2.—*Area of commercial forest land, by ownership classes, Maine, 1971*

Ownership class	Area	
	Thousand acres	*Percent*
National Forest	37.5	(1)
Other Federal	35.8	(1)
State[2]	163.0	1
County and municipal	75.2	1
Total public	311.5	2
Forest industry	8,255.0	49
Farmed-owned	1,122.1	7
Miscellaneous private:		
Individual	6,797.2	40
Corporate	408.5	2
Total miscellaneous private	7,205.7	42
All ownerships	16,894.3	100

[1]Less than 0.5 percent.
[2]Does not include 317,414 acres in public lots on which the timber and grass rights are privately owned.

Table 3.—*Area of commercial forest land, by stand-size and ownership classes, Maine, 1971*

[In thousands of acres]

Stand-size class	All ownerships	National Forest	Other public	Forest industry	Farmer and other
Sawtimber stands	6,142.8	19.5	31.3	3,684.2	2,407.8
Poletimber stands	5,339.6	15.5	145.0	2,892.2	2,286.9
Sapling-seedling stands	5,268.8	2.5	97.5	1,678.6	3,490.2
Nonstocked areas	143.1	—	.2	—	142.9
All classes	16,894.3	37.5	274.0	8,255.0	8,327.8

Table 4.—*Area of commercial forest land, by stand-volume and ownership classes, Maine, 1971*

[In thousands of acres]

Stand-volume per acre (board feet)[1]	All ownerships	National Forest	Other public	Forest industry	Farmer and other
Less than 1,500	7,580.8	5.6	165.2	2,779.0	4,631.0
1,500 to 5,000	7,454.4	24.4	97.8	4,375.6	2,956.6
More than 5,000	1,859.1	7.5	11.0	1,100.4	740.2
All classes	16,894.3	37.5	274.0	8,255.0	8,327.8

[1]International ¼-inch rule.

Table 5.—*Area of commercial forest land, by stocking classes based on selected stand components, Maine, 1971*

[In thousands of acres]

Stocking class (percent)	Stocking classified in terms of—				
	All trees	Growing-stock trees			Rough and rotten trees
		Total	Desirable	Acceptable	
160	266.2	1.9	—	—	—
150 to 160	2,212.5	181.1	—	53.6	10.4
140 to 150	3,430.4	934.3	—	534.9	13.2
130 to 140	3,315.7	1,516.9	—	882.7	—
120 to 130	2,729.0	1,836.5	—	1,400.0	13.3
110 to 120	2,038.2	2,674.4	14.0	2,032.3	49.6
100 to 110	1,296.2	2,738.1	—	2,516.3	1.9
90 to 100	582,5	2,120.7	—	2,638.1	25.0
80 to 90	353.2	1,645.4	—	2,296.4	91.2
70 to 80	210.6	1,180.1	13.1	1,663.8	140.8
60 to 70	166.9	843.9	24.7	1,163.2	436.3
50 to 60	98.8	482.4	74.1	708.6	917.5
40 to 50	96.2	238.2	159.6	367.6	1,541.1
30 to 40	72.4	224.4	446.8	297.1	2,910.3
20 to 30	12.7	99.6	1,248.1	163.3	3,915.8
10 to 20	12.8	66.9	3,790.4	66.9	4,312.6
Less than 10	—	109.5	11,123.5	109.5	2,515.3
Total	16,894.3	16,894.3	16,894.3	16,894.3	16,894.3

Table 6.—*Percent of commercial forest land, by stocking classes, based on selected stand components, Maine, 1971*

Level of stocking	Stocking in terms of selected stand components expressed as a percent of all stands			
	Acceptable trees	Desirable trees	Growing-stock trees	All trees
Overstocked	9	—	16	54
Fully stocked	35	(1)	43	36
Medium stocking	46	(1)	34	8
Poorly stocked and nonstocked	10	100	7	2
All levels	100	100	100	100

[1]Less than 0.5 percent.

Table 7.—*Area of commercial forest land, by area condition and ownership classes, Maine, 1971*

[In thousands of acres]

Area-condition class[1]	All ownerships	National Forest	Other public	Forest industry	Farmer and other
Class *10-40*	39.6	—	0.2	11.7	27.7
Class *50*	7,319.8	11.3	131.1	3,701.1	3,476.3
Class *60*	7,823.2	20.6	107.8	3,904.4	3,790.4
Class *70*	1,711.7	5.6	34.9	637.8	1,033.4
All classes	16,894.3	37.5	274.0	8,255.0	8,327.8

[1]Class *10*.—Areas fully stocked with desirable trees and not overstocked.
Class *20*.—Areas fully stocked with desirable trees, but overstocked with all live trees.
Class *30*.—Areas medium to fully stocked with desirable trees, and with less than 30 percent of the area controlled by other trees and/or inhibiting vegetation or surface conditions that will prevent occupancy by desirable trees.
Class *40*.—Areas medium to fully stocked with desirable trees and with 30 percent or more of the area controlled by other trees and/or conditions that ordinarily prevent occupancy by desirable trees.
Class *50*.—Areas poorly stocked with desirable trees, but fully stocked with growing-stock trees.
Class *60*.—Areas poorly stocked with desirable trees, but with medium to full stocking of growing-stock trees.
Class *70*.—Areas poorly stocked with desirable trees, and poorly stocked with growing-stock trees.

Table 8.—*Area of commercial forest land, by potential site productivity and ownership classes, Maine, 1971*

[In thousands of acres]

Growth-per-acre class (cubic feet)	All ownerships	National Forest	Other public	Forest industry	Farmer and other
120 to 165	2,386.3	4.9	38.7	1,136.4	1,206.3
85 to 120	5,165.8	7.3	48.6	2,852.8	2,257.1
50 to 85	5,854.3	13.6	104.8	2,839.3	2,896.6
Less than 50	3,487.9	11.7	81.9	1,426.5	1,967.8
All classes	16,894.3	37.5	274.0	8,255.0	8,327.8

Table 9.—*Area of commercial forest land, by forest types and ownership classes, Maine, 1971*

[In thousands of acres]

Forest type	All ownerships	Public ownerships	Private ownerships
White-pine-red pine-hemlock	1,812.0	35.0	1,777.0
Spruce-fir	7,949.4	164.7	7,784.7
Oak-pine	185.4	10.0	175.4
Oak-hickory	252.9	—	252.9
Elm-ash-red maple	1,714.2	9.7	1,704.5
Maple-beech-birch	3,561.3	65.5	3,495.8
Aspen-birch	1,419.1	26.6	1,392.5
All types	16,894.3	311.5	16,582.8

Table 10.—*Area of noncommercial forest land, by forest types, Maine, 1971*

[In thousands of acres]

Forest type	All areas	Productive-reserved areas	Unproductive areas
White pine-red pine-hemlock	27.5	20.9	6.6
Spruce-fir	673.1	120.1	553.0
Oak-pine	1.9	1.9	—
Elm-ash-red maple	55.4	17.1	38.3
Maple-beech-birch	83.6	47.9	35.7
Aspen-birch	12.8	12.8	—
All types	854.3	220.7	633.6

Table 11.—*Number of trees on commercial forest land by species groups, tree classes, and diameter classes, Maine, 1971*

[In thousands of trees]

D.b.h. class (inches)	Softwoods			Hardwoods		
	Growing-stock trees	Rough and rotten trees	Total	Growing-stock trees	Rough and rotten trees	Total
1.0 to 2.9	2,917,717	741,882	3,659,599	1,897,003	1,311,302	3,208,305
3.0 to 4.9	2,052,261	242,955	2,295,216	835,804	426,674	1,262,478
Total saplings	4,969,978	984,837	5,954,815	2,732,807	1,737,976	4,470,783
5.0 to 6.9	1,197,626	99,224	1,296,850	415,948	159,196	575,144
7.0 to 8.9	625,997	56,317	682,314	234,923	71,912	306,835
9.0 to 10.9	—	—	—	124,363	31,369	155,732
Total poletimber	1,823,623	155,541	1,979,164	775,234	262,477	1,037,711
9.0 to 10.9	255,464	44,902	300,366	—	—	—
11.0 to 12.9	108,110	23,300	131,410	62,968	22,673	85,641
13.0 to 14.9	43,693	12,855	56,548	33,460	14,785	48,245
Total small sawtimber	407,267	81,057	488,324	96,428	37,458	133,886
15.0 to 16.9	19,256	5,828	25,084	16,991	8,945	25,936
17.0 to 18.9	8,186	3,127	11,313	8,454	4,668	13,122
19.0 to 20.9	3,405	1,354	4,759	4,408	3,019	7,427
21.0 to 28.9	3,576	1,540	5,116	3,990	3,963	7,953
29.0 and larger	347	147	494	165	364	529
Total large sawtimber	34,770	11,996	46,766	34,008	20,959	54,967
All classes	7,235,638	1,233,431	8,469,069	3,638,477	2,058,870	5,697,347

Table 12.—*Number of growing-stock trees on commercial forest land, by species and diameter classes, Maine, 1971*

[In thousands of trees]

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	118,592	37,302	30,154	17,569	13,397	8,414	5,215	2,395	1,630	2,197	319
White spruce[2]	123,036	63,498	36,348	13,501	6,372	1,736	1,003	342	136	100	—
Red spruce	648,995	326,119	176,633	82,993	36,777	16,127	6,287	2,794	869	396	—
Balsam fir	989,242	605,714	271,962	84,003	22,075	4,496	760	196	36	—	—
Hemlock	145,262	60,394	37,314	21,666	12,897	6,697	3,646	1,487	535	618	8
No. white-cedar	224,003	97,408	68,553	33,327	15,497	5,546	2,239	972	176	265	20
Other softwoods	16,530	7,191	5,033	2,405	1,095	677	106	—	23	—	—
Total softwoods	2,265,660	1,197,626	625,997	255,464	108,110	43,693	19,256	8,186	3,405	3,576	347
Red oak[3]	33,688	14,036	8,222	4,695	3,067	1,853	732	507	321	237	18
Yellow birch	97,853	38,716	21,698	15,077	10,557	5,558	2,772	1,690	905	863	17
Paper birch	137,319	73,440	34,406	19,010	5,987	2,968	764	523	138	74	9
Sugar maple	121,480	50,062	24,959	16,917	10,124	7,249	4,969	3,108	1,939	2,103	50
Soft maples	252,151	122,824	70,713	31,159	14,110	7,578	3,722	1,211	487	323	24
Beech	98,465	44,551	26,291	14,198	6,955	3,778	1,848	541	186	117	—
White ash[4]	37,350	16,245	10,150	5,222	3,057	1,353	995	175	69	68	16
Aspen	99,646	43,778	31,252	15,175	6,249	2,155	652	368	17	—	—
Other hardwoods[5]	27,718	12,296	7,232	2,910	2,862	968	537	331	346	205	31
Total hardwoods	905,670	415,948	234,923	124,363	62,968	33,460	16,991	8,454	4,408	3,990	165
All species	3,171,330	1,613,574	860,920	379,827	171,078	77,153	36,247	16,640	7,813	7,566	512

[1]Includes 4,323 thousand red pine trees.
[2]Includes 37,746 thousand black spruce trees.
[3]Includes 973 thousand select white oaks, and 690 other red oaks.
[4]Includes 13,394 thousand black ash trees.
[5]Includes 8,860 thousand basswood trees, 10,985 elm, and 7,873 other hardwood species.

Table 13.—*Net volume of timber on commercial forest land, by class of timber, softwoods and hardwoods, Maine, 1971*

[In millions of cubic feet]

Class of timber	All species	Softwoods	Hardwoods
Sawtimber trees:			
Sawlog portion	7,712.4	5,547.1	2,165.3
Upper-stem portion	1,347.2	809.8	537.4
All sawtimber trees	9,059.6	6,356.9	2,702.7
Poletimber trees	12,193.8	8,406.3	3,787.5
All growing-stock trees	21,253.4	14,763.2	6,490.2
Rough trees	1,389.6	777.6	612.0
Rotten trees	1,418.8	585.0	833.8
Total, all timber	24,061.8	16,125.8	7,936.0

Table 14.—*Net volume suitable for pulpwood on commercial forest land, by species and tree classes, Maine, 1971*

[In millions of cubic feet][1]

Species	Growing-stock trees			Rough trees	Total net volume
	Poletimber size	Sawtimber size	Total		
White pine	407.1	1,109.5	1,516.6	82.0	1,598.6
White spruce	511.6	345.5	857.1	29.2	886.3
Red spruce	2,557.5	2,205.2	4,762.7	173.4	4,936.1
Balsam fir	3,817.1	1,319.4	5,136.5	86.1	5,222.6
Hemlock	446.7	704.3	1,151.0	156.5	1,307.5
No. white-cedar	620.4	608.0	1,228.4	236.2	1,464.6
Other softwoods	45.9	65.0	110.9	14.2	125.1
Total softwoods	8,406.3	6,356.9	14,763.2	777.6	15,540.8
Northern red oak	144.3	161.7	306.0	12.8	318.8
Yellow birch	354.2	390.0	744.2	80.2	824.4
Paper birch	576.3	164.1	740.4	37.8	778.2
Sugar maple	485.0	745.0	1,230.0	89.6	1,319.6
Soft maples	1,068.1	546.8	1,614.9	134.9	1,749.8
Beech	408.4	249.8	658.2	72.6	730.8
Ash	166.4	127.0	293.4	11.4	304.8
Aspen	481.9	183.4	665.3	14.0	679.3
Other hardwoods	102.9	134.9	237.8	158.7	396.5
Total hardwoods	3,787.5	2,702.7	6,490.2	612.0	7,102.2
All species	12,193.8	9,059.6	21,253.4	1,389.6	22,643.0

[1] Because of great variation in converting factors from cubic feet to cords, the data are presented in cubic feet only.

Table 15.—*Net volume growing stock and sawtimber on commercial forest land, by ownership classes, stand-size classes, softwoods and hardwoods, Maine, 1971*

Ownership or stand-size class	Growing stock (million cubic feet)			Sawtimber (million board feet)[1]		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
			BY OWNERSHIP CLASSES			
National Forest	65.8	20.1	45.7	144.7	40.1	104.6
Other public	330.7	244.0	86.7	384.2	279.9	104.3
Forest industry	11,667.9	8,383.8	3,284.1	19,065.2	12,614.6	6,450.6
Farmer and other	9,189.0	6,115.3	3,073.7	14,925.6	10,521.3	4,404.3
All ownerships	21,253.4	14,763.2	6,490.2	34,519.7	23,455.9	11,063.8
			BY STAND-SIZE CLASSES			
Sawtimber stands	10,722.1	7,809.5	2,912.6	23,550.3	16,340.3	7,210.0
Poletimber stands	7,846.5	5,414.6	2,431.9	7,768.1	5,218.1	2,550.0
Sapling-seedling stands	2,682.1	1,537.0	1,145.1	3,197.9	1,894.1	1,303.8
Nonstocked areas	2.7	2.1	.6	3.4	3.4	—
All classes	21,253.4	14,763.2	6,490.2	34,519.7	23,455.9	11,063.8

[1]International ¼-inch rule.

Table 16.—*Net volume of growing stock and sawtimber on commercial forest land, by forest types, Maine, 1971*

Forest type	Growing stock	Sawtimber
	Million cubic feet	*Million board feet*[1]
White pine-red pine-hemlock	2,520.9	5,600.7
Spruce-fir	11,844.3	17,068.0
Oak and oak-pine	465.7	750.2
Elm-ash-red maple	1,450.3	2,159.3
Maple-beech-birch	3,794.2	7,633.6
Aspen-birch	1,178.0	1,307.9
All types	21,253.4	34,519.7

[1]International ¼-inch rule.

Table 17.—*Net volume of growing stock on commercial forest land, by species and diameter classes, Maine, 1971*

[In millions of cubic feet]

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0 10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	1,516.6	184.8	222.3	184.1	206.0	180.4	153.8	93.3	82.0	168.7	41.2
White spruce[2]	857.1	267.3	244.3	145.0	101.0	38.5	31.9	14.2	7.2	7.7	—
Red spruce	4,762.7	1,380.0	1,177.5	875.2	575.2	367.8	199.8	113.6	46.2	27.4	—
Balsam fir	5,136.5	2,126.2	1,690.9	857.5	332.4	96.6	23.6	7.5	1.8	—	—
Hemlock	1,151.0	230.9	215.8	192.3	173.2	129.6	97.6	51.7	23.1	35.7	1.1
No. white-cedar	1,228.4	287.2	333.2	254.5	173.6	84.3	48.1	27.1	6.3	11.8	2.3
Other softwoods	110.9	18.0	27.9	23.5	20.0	16.5	3.7	—	1.3	—	—
Total softwoods	14,763.2	4,494.4	3,911.9	2,532.1	1,581.4	913.7	558.5	307.4	167.9	251.3	44.6
Northern red oak[3]	306.0	44.5	51.0	48.8	47.3	40.2	20.6	19.3	16.1	16.3	1.9
Yellow birch	744.2	122.0	111.9	120.3	126.3	92.0	58.5	45.8	29.0	36.7	1.7
Paper birch	740.4	232.3	183.3	160.7	73.8	49.1	17.4	14.5	4.6	3.8	.9
Sugar maple	1,230.0	173.8	149.4	161.8	146.0	148.3	133.8	108.2	83.4	120.6	4.7
Soft maples	1,614.9	375.6	398.4	294.1	203.4	153.1	103.6	43.2	21.7	18.5	3.3
Beech	658.2	137.6	145.5	125.3	97.2	72.2	47.6	18.2	7.6	7.0	—
White ash[4]	293.4	49.8	62.7	53.9	47.6	30.6	32.4	7.3	3.2	4.5	1.4
Aspen	665.3	134.9	189.5	157.5	100.7	48.5	19.9	13.6	.7	—	—
Other hardwoods[5]	237.8	36.8	38.8	27.3	44.9	22.3	17.6	10.9	21.2	13.8	4.2
Total hardwoods	6,490.2	1,307.3	1,330.5	1,149.7	887.2	656.3	451.4	281.0	187.5	221.2	18.1
All species	21,253.4	5,801.7	5,242.4	3,681.8	2,468.6	1,570.0	1,009.9	588.4	355.4	472.5	62.7

[1]Includes 42.5 million cubic feet of red pine.
[2]Includes 207.7 million cubic feet of black spruce.
[3]Includes 6.0 million cubic feet of select white oaks and 5.4 of other red oaks.
[4]Includes 107.2 million cubic feet of black ash.
[5]Includes 87.2 million cubic feet of basswood, 101.8 of elm, and 48.8 of other hardwood species.

Table 18.—*Net volume of sawtimber on commercial forest land, by species and diameter classes, Maine, 1971*

[In millions of board feet][1]

Species	Total	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[2]	4,568.3	613.2	790.7	761.8	673.4	423.0	377.7	745.3	183.2
White spruce[3]	1,265.6	487.5	372.0	151.2	128.5	58.5	33.4	34.5	—
Red spruce	8,039.0	2,931.8	2,116.6	1,422.0	803.7	460.7	194.2	110.0	—
Balsam fir	4,533.4	2,845.3	1,204.9	358.9	89.3	28.5	6.5	—	—
Hemlock	2,666.4	635.1	640.7	518.8	412.4	217.2	92.0	145.3	4.9
No. white-cedar	2,144.7	819.7	619.7	318.0	185.5	106.5	28.2	54.6	12.5
Other softwoods	238.5	78.9	74.6	66.3	14.0	—	4.7	—	—
Total softwoods	23,455.9	8,411.5	5,819.2	3,597.0	2,306.8	1,294.4	736.7	1,089.7	200.6
Northern red oak[4]	693.5	—	186.0	168.1	90.5	86.7	81.0	72.5	8.7
Yellow birch	1,608.1	—	451.3	368.3	250.7	204.5	142.2	183.7	7.4
Paper birch	646.9	—	270.7	194.7	72.3	64.7	22.7	17.5	4.3
Sugar maple	3,234.6	—	532.6	594.3	580.6	501.1	397.6	607.4	21.0
Soft maples	2,123.6	—	712.0	599.9	424.9	188.3	94.3	87.8	16.4
Beech	998.8	—	345.2	284.4	206.6	82.5	41.7	38.4	—
White ash[5]	491.6	—	174.3	116.2	132.1	29.1	13.7	20.1	6.1
Aspen	690.6	—	355.7	189.6	82.9	59.3	3.1	—	—
Other hardwoods[6]	576.1	—	164.8	90.6	77.6	53.1	104.7	65.1	20.2
Total hardwoods	11,063.8	—	3,192.6	2,606.1	1,918.2	1,269.3	901.0	1,092.5	84.1
All species	34,519.7	8,411.5	9,011.8	6,203.1	4,225.0	2,563.7	1,637.7	2,182.2	284.7

[1]International ¼-inch rule.
[2]Includes 104.4 million board feet of red pine.
[3]Includes 107.5 million board feet of black spruce.
[4]Includes 16.7 million board feet of select white oaks and 7.2 of other red oaks.
[5]Includes 198.2 million board feet of black ash.
[6]Includes 208.5 million board feet of basswood, 276.2 of elm, and 91.4 of other hardwood species.

Table 19.—*Net volume of sawtimber on commercial forest land, by species and quality classes, Maine, 1971*

[In millions of board feet][1]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[2]
Softwoods:					
White pine[3]	4,568.3	162.5	406.9	2,276.3	1,722.6
Other softwoods[4]	18,887.6	—	—	—	—
Total softwoods	23,455.9	162.5	406.9	2,276.3	1,722.6
Hardwoods:					
Northern red oak	693.5	122.8	161.0	344.5	65.2
Yellow birch	1,608.1	205.3	418.7	848.0	136.1
Paper birch	646.9	50.5	145.5	397.8	53.1
Sugar maple	3,234.6	565.8	816.8	1,487.5	364.5
Soft maples	2,123.6	152.4	430.5	1,222.4	318.3
Beech	998.8	18.2	77.4	705.8	197.4
White ash	491.6	89.6	128.5	198.9	74.6
Aspen	690.6	33.6	112.8	391.1	153.1
Other hardwoods	576.1	99.1	151.6	270.6	54.8
Total hardwoods	11,063.8	1,337.3	2,442.8	5,866.6	1,417.1
Hardwood quality (in percent)	100	12	22	53	13

[1]International ¼-inch rule.
[2]Grade 4 applies only to the pines. For hardwoods the volumes in this column are construction logs.
[3]Includes 104.4 million board feet of red pine.
[4]Species other than pines were not graded into standard-lumber logs.

Table 20.—*Annual net growth and removals of growing stock and sawtimber on commercial forest land, by species, Maine, 1970*

Species	Growing stock		Sawtimber	
	Annual net growth	Annual timber removals	Annual net growth	Annual timber removals
	Thousand cubic feet		*Thousand board feet*[1]	
Softwoods:				
White pine	73,725	71,176	281,880	312,815
Spruce	207,015	84,893	490,384	261,811
Balsam fir	196,953	63,119	268,087	145,462
Hemlock	51,603	30,504	139,042	107,786
No. white-cedar	16,869	20,068	33,436	47,820
Other softwoods	3,835	5,440	11,171	2,306
Total softwoods	550,000	275,200	1,224,000	878,000
Hardwoods:				
Northern red oak	9,729	14,784	36,688	51,342
Yellow birch	7,278	19,214	18,844	62,979
Paper birch	21,809	18,179	39,369	38,713
Sugar maple	28,087	27,845	70,976	75,259
Soft maples	41,682	23,757	129,077	105,813
Beech	13,037	9,473	9,672	17,337
Ash	7,514	10,141	26,099	32,225
Aspen	25,956	3,857	44,224	12,704
Other hardwoods	5,708	6,250	23,051	24,628
Total hardwoods	160,800	133,500	398,000	421,000
Total, all species	710,800	408,700	1,622,000	1,299,000

[1]International ¼-inch rule.

Table 21.—*Annual net growth and removals of growing stock and sawtimber on commercial forest land, by ownership classes, softwoods and hardwoods, Maine 1970*

Ownership	Annual net growth			Annual timber removals		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
			GROWING STOCK			
			Thousand cubic feet			
National Forest	1,820	759	1,061	659	178	481
Other public	10,940	8,663	2,277	6,404	4,698	1,706
Forest industry	382,615	302,173	80,442	187,342	124,833	62,509
Farmer and misc. private	315,425	238,405	77,020	214,295	145,491	68,804
All ownerships	710,800	550,000	160,800	408,700	275,200	133,500
			SAWTIMBER			
			Thousand board feet[1]			
National Forest	3,947	1,553	2,394	892	250	642
Other public	18,596	15,011	3,585	19,717	14,557	5,160
Forest industry	838,723	615,375	223,348	595,689	387,120	208,569
Farmer and misc. private	760,734	592,061	168,673	682,702	476,073	206,629
All ownerships	1,622,000	1,224,000	398,000	1,299,000	878,000	421,000

[1]International ¼-inch rule.

Table 22.—*Components of average annual net growth of growing stock and sawtimber on commercial forest land, softwoods and hardwoods, Maine, 1958-70*

Components	All species	Softwoods	Hardwoods
	GROWING STOCK		
	Thousand cubic feet		
Growth on initial growing stock[1]	386,811	281,110	105,701
Ingrowth—saplings that became poletimber	507,391	377,353	130,038
Gross growth	894,202	658,463	235,739
Cull increment	133,702	74,063	59,639
Annual mortality	123,700	90,000	33,700
Average annual net growth	636,800	494,400	142,400
	SAWTIMBER		
	Thousand board feet[2]		
Growth on initial sawtimber inventory[1]	619,355	400,710	218,645
Ingrowth—poletimber trees that became sawtimber	990,782	650,733	340,049
Gross growth	1,610,137	1,051,443	558,694
Cull increment	375,437	105,843	269,594
Annual mortality	171,700	127,100	44,600
Average annual net growth	1,063,000	818,500	244,500

[1]Including growth on trees that were cut.
[2]International ¼-inch rule.

Table 23.—*Annual mortality of growing stock and sawtimber on commercial forest land, by species, Maine, 1970*

Species	Growing stock	Sawtimber
	Thousand cubic feet	*Thousand board feet*[1]
Softwoods:		
White pine	11,130	24,663
Spruce	20,159	38,298
Balsam fir	54,783	80,375
Hemlock	3,830	8,959
No. white-cedar	7,773	16,486
Other softwoods	2,525	5,219
Total softwoods	100,200	174,000
Hardwoods:		
Northern red oak	624	1,076
Yellow birch	6,015	25,295
Paper birch	5,910	5,784
Sugar maple	2,275	4,576
Soft maples	8,021	9,518
Beech	3,053	6,570
Ash	909	1,585
Aspen	6,343	7,000
Other hardwoods	2,950	8,596
Total hardwoods	36,100	70,000
Total, all species	136,300	244,000

[1]International ¼-inch rule.

Table 24.—*Annual mortality of growing stock and sawtimber, on commercial forest land, by ownership classes, causes, softwoods and hardwoods, Maine, 1970*

Ownership and cause	Growing stock (thousand cubic feet)			Sawtimber (thousand board feet)[1]		
	All species	Softwoods	Hardwoods	All species	Softwoods	Hardwoods
			BY OWNERSHIP CLASS			
National Forest	236	85	151	470	156	314
Other public	2,232	1,750	482	2,730	2,004	726
Forest industry	71,567	53,417	18,150	131,225	91,178	40,047
Farmer and other	62,265	44,948	17,317	109,575	80,662	28,913
All ownerships	136,300	100,200	36,100	244,000	174,000	70,000
			BY CAUSE			
Disease	74,376	48,840	25,536	130,202	74,988	55,214
Weather	36,244	32,692	3,552	76,260	69,162	7,098
Suppression	4,277	3,647	630	1,941	1,941	—
Sapsucker	3,388	1,520	1,868	7,004	3,700	3,304
Insects	2,963	2,811	152	5,974	5,974	—
Fire	62	—	62	—	—	—
Other	4,479	3,071	1,408	7,349	4,040	3,309
Unknown	10,511	7,619	2,892	15,270	14,195	1,075
All causes	136,300	100,200	36,100	244,000	174,000	70,000

[1]International ¼-inch rule

Table 25.—*Sampling errors for major forest area and timber-volume classes in Maine, 1971*

Table No.	Item classification	Sampling error
	FOREST AREA	
		Percent
1	Forest-land area:	
	Commercial	0.4
	Unproductive	11.1
	Total	0.5
2	Ownership:[1]	
	Forest industry	2
	Farmer-owned	10
	Misc. private	3
	Farmer and misc. private	3
3	Stand-size class:	
	Sawtimber	3
	Poletimber	4
	Sapling-seedling	4
	Nonstocked areas	27
4	Stand-volume per acre (board feet):	
	Less than 1,500	3
	1,500 to 5,000	3
	More than 5,000	7
7	Area-condition class:	
	10-40	(*)
	50	3
	60	3
	70	8
8	Growth-per-acre class (cubic feet):	
	120 to 165	7
	85 to 120	4
	50 to 85	4
	Less than 50	5
9	Forest type:	
	White-red pine-hemlock	7
	Spruce-fir	3
	Oak and oak-pine	17
	Elm-ash-red maple	8
	Maple-beech-birch	5
	Aspen-birch	9

Table No.	Item classification	Sampling error	
	TIMBER VOLUME		
		Cubic feet	*Board feet*
		Percent	
13	Class of timber:		
	Sawtimber trees	2	—
	Poletimber trees	1	—
	All growing stock	1	—
	Rough trees	4	—
	Rotten trees	3	—
	All live trees	1	—
15	Ownership and stand-size:		
	National Forest	11	15
	Other public	24	27
	Forest industry	3	3
	Farmer and other	4	4
	Sawtimber stands	3	3
	Poletimber stands	4	6
	Sapling-seedling	5	8
	Nonstocked areas	(*)	(*)
	Softwoods	2	2
	Hardwoods	3	4
	All classes	1	2
17-18	Diameter classes (inches):		
	5.0- 6.9	2	—
	7.0- 8.9	2	—
	9.0-10.9[2]	2	3
	11.0-12.9	2	3
	13.0-14.9	3	3
	15.0-16.9	4	4
	17.0-18.9	5	5
	19.0-20.9	7	6
	21.0-28.9	7	6
	29.0 and larger	16	16

CONTINUED

Table 25—Continued

Table No.	Item classification	Sampling error	
		Cubic feet	*Board feet*
		Percent	
17-18	Species:		
	White pine	7	7
	Red pine	24	27
	White spruce	8	9
	Black spruce	22	32
	Red spruce	3	4
	Balsam fir	3	5
	Hemlock	8	9
	No. white-cedar	6	8
	Other softwoods	20	24
	Select red oaks	13	16
	Select white oaks	(*)	(*)
	Other red oaks	40	(*)
	Yellow birch	6	7
	Paper birch	6	11
	Sugar maple	7	8
	Soft maples	4	6
	Beech	8	11
	White ash	13	18
	Black ash	15	19
	Aspen	9	15
	Basswood	23	25
	Elm	22	28
	Other hardwoods	18	27
	GROWTH-REMOVAL		
		Cubic feet	*Board feet*
		Percent	
20	Growth by:		
	Softwoods	4	5
	Hardwoods	7	18
	All species	4	5
20	Removals by:		
	Softwoods	14	19
	Hardwoods	13	17
	All species	12	16
	MORTALITY		
24	By species group:		
	Softwoods	6	10
	Hardwoods	8	16
	All species	5	9
20	By cause:		
	Disease	6	12
	Weather	10	15
	Suppression	34	(*)
	Sapsucker	39	46
	Insects	(*)	(*)
	Fire	(*)	—
	Other	21	41
	Unknown	22	35

*Sampling errors of 50 to 99 percent.
[1]Some classifications have no sampling errors and some less important classifications have been omitted.
[2]Board-foot sampling error for this class is for softwoods only.

Table 26.—*Output of timber products, by source of material, softwoods and hardwoods, Maine, 1970*

Product and species group	Standard units	Total output		Output from roundwood		Output from plant byproducts	
		Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Sawlogs:							
Softwood	M bd. ft.[1]	486,574	82,825	486,574	82,825	—	—
Hardwood	M bd. ft.[1]	147,381	22,924	147,381	22,924	—	—
Total	M bd. ft.[1]	633,955	105,749	633,955	105,749	—	—
Veneer logs and bolts:							
Softwood	M bd. ft.[1]	15	3	15	3	—	—
Hardwood	M bd. ft.[1]	36,914	6,620	36,914	6,620	—	—
Total	M bd. ft.[1]	36,929	6,623	36,929	6,623	—	—
Pulpwood:							
Softwood	Std. cords[2]	2,508,149	213,193	2,320,212	197,218	187,937	15,975
Hardwood	Std. cords[2]	960,851	81,672	900,663	76,556	60,188	5,116
Total	Std.cords[2]	3,469,000	294,865	3,220,875	273,774	248,125	21,091
Cooperage logs and bolts:							
Softwood	M bd. ft.[1]	330	58	330	58	—	—
Hardwood	M bd. ft.[1]	215	38	215	38	—	—
Total	M bd. ft.[1]	545	96	545	96	—	—
Piling:							
Softwood	M linear ft.	9	5	9	5	—	—
Hardwood	M linear ft.	8	5	8	5	—	—
Total	M linear ft.	17	10	17	10	—	—
Poles:							
Softwood	M pieces	2	22	2	22	—	—
Hardwood	M pieces	—	—	—	—	—	—
Total	M pieces	2	22	2	22	—	—
Posts (round and split):							
Softwood	M pieces	647	591	647	591	—	—
Hardwood	M pieces	1	1	1	1	—	—
Total	M pieces	648	592	648	592	—	—

CONTINUED

Table 26.—Continued

Product and species group	Standard units	Total output		Output from roundwood		Output from plant byproducts	
		Number of units	Thousand cubic feet	Number of units	Thousand cubic feet	Number of units	Thousand cubic feet
Other:[3]							
Softwood	M cu. ft.	3,238	3,238	3,238	3,238	—	—
Hardwood	M cu. ft.	—	—	—	—	—	—
Total	M cu. ft.	3,238	3,238	3,238	3,238	—	—
Total industrial products:[4]							
Softwood	—	—	299,935	—	283,960	—	15,975
Hardwood	—	—	111,260	—	106,144	—	5,116
Total	—	—	411,195	—	390,104	—	21,091
Fuelwood:							
Softwood	Std. cords	61,025	4,882	2,187	175	58,838	4,707
Hardwood	Std. cords	263,475	21,078	217,088	17,367	46,387	3,711
Total	Std. cords	324,500	25,960	219,275	17,542	105,225	8,418
All products:							
Softwood	—	—	304,817	—	284,135	—	20,682
Hardwood	—	—	132,338	—	123,511	—	8,827
Total	—	—	437,155	—	407,646	—	29,509

[1]International ¼-inch rule.
[2]Rough-wood basis, includes chips converted to equivalent standard cords.
[3]Includes railroad ties, shingle bolts, and fence rails; does not include residues used for agricultural bedding.
[4]No mine timbers are produced in Maine.

Table 27.—*Output of roundwood products, by source, softwoods and hardwoods, Maine, 1970*

[In thousands of cubic feet]

Product and species group	All sources	Growing-stock trees[1]			Rough and rotten trees[1]	Salvable dead trees[1]	Other sources[2]
		Total	Sawtimber	Poletimber			
PRINCIPAL INDUSTRIAL PRODUCTS							
Sawlogs:							
Softwood	82,825	76,558	74,327	2,231	495	—	5,772
Hardwood	22,924	21,463	19,991	1,472	61	—	1,400
Total	105,749	98,021	94,318	3,703	556	—	7,172
Veneer logs and bolts:							
Softwood	3	3	3	—	—	—	—
Hardwood	6,620	6,382	6,261	121	—	—	238
Total	6,623	6,385	6,264	121	—	—	238
Pulpwood:							
Softwood	197,218	151,278	124,422	26,856	4,185	3,022	38,733
Hardwood	76,556	65,546	45,549	19,997	1,630	113	9,267
Total	273,774	216,824	169,971	46,853	5,815	3,135	48,000
MISCELLANEOUS INDUSTRIAL PRODUCTS							
Cooperage logs and bolts:							
Softwood	58	56	50	6	—	—	2
Hardwood	38	33	25	8	—	—	5
Total	96	89	75	14	—	—	7
Piling:							
Softwood	5	5	5	—	—	—	—
Hardwood	5	4	4	—	—	—	1
Total	10	9	9	—	—	—	1
Poles:							
Softwood	22	21	20	1	—	—	1
Hardwood	—	—	—	—	—	—	—
Total	22	21	20	1	—	—	1

CONTINUED

Table 27.—Continued

Product and species group	All sources	Growing-stock trees[1]			Rough and rotten trees[1]	Salvable dead trees[1]	Other sources[2]
		Total	Sawtimber	Poletimber			
Posts (round and split):							
Softwood	591	561	502	59	—	3	27
Hardwood	1	1	1	—	—	—	—
Total	592	562	503	59	—	3	27
Other:							
Softwood	3,238	3,072	2,752	320	—	17	149
Hardwood	—	—	—	—	—	—	—
Total	3,238	3,072	2,752	320	—	17	149
All misc. industrial products:							
Softwood	3,914	3,715	3,329	386	—	20	179
Hardwood	44	38	30	8	—	—	6
Total	3,958	3,753	3,359	394	—	20	185
Total industrial products:							
Softwood	283,960	231,554	202,081	29,473	4,680	3,042	44,684
Hardwood	106,144	93,429	71,831	21,598	1,691	113	10,911
Total	390,104	324,983	273,912	51,071	6,371	3,155	55,595
NONINDUSTRIAL PRODUCTS							
Fuelwood:							
Softwood	175	149	69	80	10	8	8
Hardwood	17,367	15,040	8,498	6,542	1,207	923	197
Total	17,542	15,189	8,567	6,622	1,217	931	205
ALL PRODUCTS							
Softwood	284,135	231,703	202,150	29,553	4,690	3,050	44,692
Hardwood	123,511	108,469	80,329	28,140	2,898	1,036	11,108
Total	407,646	340,172	282,479	57,693	7,588	4,086	55,800

[1]On commercial forest land.
[2]Includes trees less than 5.0 inches in diameter, tree tops and limbs from commercial forest areas, or any material from noncommercial forest land or nonforest land such as fence rows and suburban areas.

Table 28.—*Timber removals from growing stock on commercial forest land, by items, softwoods and hardwoods, Maine, 1970*

[In thousands of cubic feet]

Item	All species	Soft-woods	Hard-woods
Roundwood products:			
Sawlogs	98,021	76,558	21,463
Veneer logs and bolts	6,385	3	6,382
Pulpwood	216,824	151,278	65,546
Cooperage logs and bolts	89	56	33
Piling	9	5	4
Poles	21	21	—
Posts	562	561	1
Other	3,072	3,072	—
Fuelwood	15,189	149	15,040
All products	340,172	231,703	108,469
Logging residues	55,806	36,188	19,618
Other removals	12,681	7,295	5,386
Total removals	408,659	275,186	133,473

Table 29.—*Timber removals from live sawtimber on commercial forest land, by items, softwoods and hardwoods, Maine, 1970*

[In thousands of board feet][1]

Item	All species	Soft-woods	Hard-woods
Roundwood products:			
Sawlogs	448,803	340,331	108,472
Veneer logs and bolts	33,165	16	33,149
Pulpwood	670,401	471,662	198,739
Cooperage logs and bolts	334	218	116
Piling	45	23	22
Poles	92	92	—
Posts	2,197	2,192	5
Other	12,015	12,015	—
Fuelwood	37,340	262	37,078
All products	1,204,392	826,811	377,581
Logging residues	55,414	26,539	28,875
Other removals	39,013	24,709	14,304
Total removals	1,298,819	878,059	420,760

[1]International ¼-inch rule.

Table 30.—*Volume of unused residues at primary manufacturing plants, by industry and type of residue, softwoods, and hardwoods, Maine, 1970*

[In thousands of cubic feet]

Species group and type of residues	All industries	Lumber	Veneer and plywood	Other
Softwoods:				
Coarse[1]	1,797	1,741	—	56
Fine[2]	4,207	4,076	—	131
Total	6,004	5,817	—	187
Hardwoods:				
Coarse[1]	1,273	1,213	60	—
Fine[2]	3,150	2,866	284	—
Total	4,423	4,079	344	—
All species:				
Coarse[1]	3,070	2,954	60	56
Fine[2]	7,357	6,942	284	131
Total	10,427	9,896	344	187

[1]Material, such as slabs, edgings, and veneer cores.
[2]Material, such as sawdust and shavings.
Note: The volume of used residues is shown under "Output from plant byproducts" of table 26.

Table 31.—*Projections of net annual growth, available cut, and inventory of growing stock and sawtimber on commercial forest land, Maine, 1971-2001*[1]

Species group	1971 (inventory year)	1981	1991	2001
		GROWING STOCK		
		Million cubic feet		
Softwoods:				
Cut	275.2	420.4	554.6	668.0
Growth	550.0	604.6	648.1	670.7
Inventory	14,763.2	17,011.0	18,354.4	18,790.3
Hardwoods:				
Cut	133.5	147.7	170.5	190.1
Growth	160.8	166.6	180.8	191.7
Inventory	6,490.2	6,716.9	6,858.4	6,913.6
Total				
Cut	408.7	568.1	725.1	858.1
Growth	710.8	771.2	828.9	862.4
Inventory	21,253.4	23,727.9	25,212.8	25,703.9
		SAWTIMBER		
		Million board feet[2]		
Softwoods:				
Cut	878	833	1,063	1,242
Growth	1,224	1,060	1,151	1,180
Inventory	23,456	26,369	27,877	27,940
Hardwoods:				
Cut	421	286	299	302
Growth	398	269	270	265
Inventory	11,064	10,959	10,717	10,379
Total:				
Cut	1,299	1,119	1,362	1,544
Growth	1,622	1,329	1,421	1,445
Inventory	34,520	37,328	38,594	38,319

[1]Based upon the following assumptions: Farmland abandonment and reversion to forest will be offset by forest land lost by land clearing, growth rates will continue to be the same for the next 30 years, and trends in forestry programs will continue at the same rate as in the past. Timber available for cutting in this projection is assumed to be that amount that will bring growth and cut into balance by the end of 30 years.

[2]International ¼-inch rule.

Table 32.—*Land area of Maine, by land classes and geographic units, 1971*

Geographic unit	Total land area	Nonforest land area	Forest-land area				
			Total	Unproductive	Productive-reserved	Commercial	Sampling error
	Thousand acres						*Percent*
Aroostook County	4,365.2	486.2	3,879.0	124.6	8.1	3,746.3	1
Capitol region[1]	1,556.4	401.9	1,154.5	20.3	2.0	1,132.2	4
Casco Bay[1]	1,671.3	369.2	1,302.1	13.5	.5	1,288.1	2
Hancock County	983.7	74.8	908.9	14.5	31.7	862.7	2
Penobscot County	2,169.9	175.5	1,994.4	138.9	2.9	1,852.6	2
Piscataquis County	2,497.6	93.8	2,403.8	51.3	174.3	2,178.2	1
Somerset County	2,492.3	165.4	2,326.9	94.2	—	2,232.7	1
Washington County	1,634.5	124.1	1,510.4	71.4	—	1,439.0	1
Western Maine[1]	2,426.2	157.6	2,268.6	104.9	1.2	2,162.5	2
State total	19,797.1	2,048.5	17,748.6	633.6	220.7	16,894.3	0.4

[1]For county breakdowns of land classes in these units, see table 94.

Table 33.—*Area of commercial forest land in Maine, by ownership classes and geographic units, 1971*

[In thousands of acres]

Geographic unit	Public				Private			
	Federal	State	Other	Total	Forest industry	Farmer	Other	Total
Aroostook County	6.1	25.5	48.3	79.9	2,175.5	275.1	1,215.8	3,666.4
Capitol region[1]	.4	11.6	5.7	17.7	12.3	164.7	937.5	1,114.5
Casco Bay[1]	4.9	7.5	5.5	17.9	25.5	175.2	1,069.5	1,270.2
Hancock County	.6	9.6	—	10.2	290.6	49.4	512.5	852.5
Penobscot County	3.5	11.4	4.0	18.9	1,023.2	125.9	684.6	1,833.7
Piscataquis County	.3	39.5	2.6	42.4	1,241.0	73.7	821.1	2,135.8
Somerset County	.1	11.4	2.6	14.1	1,331.0	121.9	765.7	2,218.6
Washington County	19.9	25.3	1.4	46.6	828.3	10.4	553.7	1,392.4
Western Maine[1]	37.5[2]	21.2	5.1	63.8	1,327.6	125.8	645.3	2,098.7
State total	73.3	163.0	75.2	311.5	8,255.0	1,122.1	7,205.7	16,582.8

[1]For county breakdowns of major ownership classes in these units, see table 95.
[2]All this acreage is part of the White Mountain National Forest.

Table 34.—*Area of commercial forest land in Maine, by stand-size classes and geographic units, 1971*

[In thousands of acres]

Geographic unit	Stand-size class				Total
	Sawtimber stands	Poletimber stands	Sapling-seedling stands	Non-stocked areas	
Aroostook County	1,788.8	1,000.4	957.1	—	3,746.3
Capitol region[1]	225.7	202.4	679.0	25.1	1,132.2
Casco Bay[1]	398.2	283.6	606.3	—	1,288.1
Hancock County	213.7	243.4	392.9	12.7	862.7
Penobscot County	735.2	516.8	587.4	13.2	1,852.6
Piscataquis County	997.1	754.5	426.6	—	2,178.2
Somerset County	838.0	820.8	548.7	25.2	2,232.7
Washington County	380.1	539.3	477.9	41.7	1,439.0
Western Maine[1]	552.9	991.5	592.9	25.2	2,162.5
State total	6,129.7	5,352.7	5,268.8	143.1	16,894.3

[1]For county breakdowns of stand-size classes in these units, see table 96.

Table 35.—*Area of commercial forest land in Maine, by stand-volume classes and geographic units, 1971*

[In thousands of acres]

Geographic unit	Stand-volume class (board feet per acre)			Total
	Less than 1,500	1,500 to 5,000	More than 5,000	
Aroostook County	1,258.4	1,749.2	738.7	3,746.3
Capitol region	755.4	351.8	25.0	1,132.2
Casco Bay	657.3	502.5	128.3	1,288.1
Hancock County	602.1	212.6	48.0	862.7
Penobscot County	915.7	771.9	165.0	1,852.6
Piscataquis County	647.8	1,104.9	425.5	2,178.2
Somerset County	942.6	1,154.1	136.0	2,232.7
Washington County	799.9	566.8	72.3	1,439.0
Western Maine	1,001.6	1,040.6	120.3	2,162.5
State total	7,580.8	7,454.4	1,859.1	16,894.3

Table 36.—*Area of commercial forest land in Maine, by stocking-percent classes and geographic units, 1971*

[In thousands of acres]

Geographic unit	Stocking class (in percent)				Total
	70 or more	40 to 70	10 to 40	Less than 10	
Aroostook County	3,408.1	275.4	62.8	—	3,746.3
Capitol region[1]	947.8	147.0	12.3	25.1	1,132.2
Casco Bay[1]	1,043.1	180.0	65.0	—	1,288.1
Hancock County	727.9	95.7	26.5	12.6	862.7
Penobscot County	1,602.1	188.3	49.0	13.2	1,852.6
Piscataquis County	2,042.4	100.2	35.6	—	2,178.2
Somerset County	2,046.9	128.4	44.8	12.6	2,232.7
Washington County	1,209.9	166.6	41.7	20.8	1,439.0
Western Maine[1]	1,801.2	282.9	53.2	25.2	2,162.5
State total	14,829.4	1,564.5	390.9	109.5	16,894.3

[1]For county breakdowns of stocking classes in these units, see table 97.

Table 37.—*Area of commercial forest land in Maine, by area-condition classes and geographic units, 1971*

[In thousands of acres]

Geographic unit	Area-condition class[1]				Total
	Classes *10* to *40*	Class *50*	Class *60*	Class *70*	
Aroostook County	13.1	1,617.6	1,821.3	294.3	3,746.3
Capitol region	12.5	424.4	509.6	185.7	1,132.2
Casco Bay	—	486.7	621.0	180.4	1,288.1
Hancock County	14.0	337.2	384.1	127.4	862.7
Penobscot County	—	834.1	830.7	187.8	1,852.6
Piscataquis County	—	1,041.9	987.8	148.5	2,178.2
Somerset County	—	1,196.5	882.5	153.7	2,232.7
Washington County	—	631.6	682.5	124.9	1,439.0
Western Maine	22.5	738.5	1,083.1	318.4	2,162.5
State total	62.1	7,308.5	7,802.6	1,721.1	16,894.3

[1]See State table 7 for definitions of these classes.

Table 38.—*Area of commercial forest land in Maine, by potential site productivity classes and geographic units, 1971*

[In thousands of acres]

Geographic unit	Site class (cubic feet per acre)				Total
	Over 120	85 to 120	50 to 85	Under 50	
Aroostock County	625.8	1,603.4	1,211.0	306.1	3,746.3
Capitol region	184.7	225.3	399.5	322.7	1,132.2
Casco Bay	115.5	220.0	491.3	461.3	1,288.1
Hancock County	105.0	198.2	324.6	234.9	862.7
Penobscot County	377.4	506.3	580.1	388.8	1,852.6
Piscataquis County	245.7	684.1	768.3	480.1	2,178.2
Somerset County	295.4	923.5	645.0	368.8	2,232.7
Washington County	156.1	384.3	650.6	248.0	1,439.0
Western Maine	280.7	420.7	783.9	677.2	2,162.5
State total	2,386.3	5,165.8	5,854.3	3,487.9	16,894.3

Table 39.—*Area of commercial forest land in Maine, by forest-type groups and geographic units, 1971*

[In thousands of acres]

Geographic unit	Forest-type group						Total
	White pine-red pine-hemlock	Spruce-fir	Oak and oak-pine	Elm-ash-red maple	Maple-beech-birch	Aspen-birch	
Aroostook County	71.7	2,369.0	25.9	180.0	838.4	261.3	3,746.3
Capitol region[1]	286.0	336.2	62.1	223.5	125.5	98.9	1,132.2
Casco Bay[1]	578.3	64.1	182.1	218.5	79.7	165.4	1,288.1
Hancock County	90.2	472.0	36.7	90.2	92.0	81.6	862.7
Penobscot County	253.9	881.6	12.8	252.3	338.6	113.4	1,852.6
Piscataquis County	86.8	1,292.2	23.2	123.7	579.1	73.2	2,178.2
Somerset County	81.4	1,046.4	25.8	174.9	681.0	223.2	2,232.7
Washington County	102.2	850.3	31.3	133.9	82.9	238.4	1,439.0
Western Maine[1]	261.5	637.6	38.4	317.2	744.1	163.7	2,162.5
State total[2]	1,812.0	7,949.4	438.3	1,714.2	3,561.3	1,419.1	16,894.3

[1]For county breakdowns of forest-type groups in these units, see table 98.
[2]Of the 438,300 acres in the oak types, the oak-pine type totals 185,400 acres.

Table 40.—*Area of commercial forest land by local forest types, major forest types and geographic units, 1971*

[In thousands of acres]

Local forest type and major forest type	Geographic unit									Total
	Aroostook County	Capitol region	Casco Bay	Hancock County	Penobscot County	Piscataquis County	Somerset County	Washington County	Western Maine	
Jack pine	—	—	—	13.2	13.2	—	—	—	—	26.4
White pine	13.1	184.6	396.8	12.6	37.1	62.3	43.9	10.0	125.3	885.7
White pine-hemlock	10.9	37.4	77.9	36.6	38.1	—	—	51.1	47.3	299.3
Hemlock	47.7	64.0	103.6	27.8	165.5	24.5	37.5	41.1	88.9	600.6
White pine-red pine-hemlock	71.7	286.0	578.3	90.2	253.9	86.8	81.4	102.2	261.5	1,812.0
Balsam fir	1,453.6	234.8	12.9	210.4	415.7	556.2	644.2	352.8	464.9	4,345.5
Black spruce	51.8	24.9	—	—	25.1	49.5	—	31.0	6.6	188.9
Red spruce-balsam fir	447.5	39.1	25.5	183.7	214.5	461.5	263.0	279.1	103.7	2,017.6
Northern white-cedar	355.8	37.4	—	64.8	188.6	200.5	131.3	125.1	37.5	1,141.0
Tamarack	13.1	—	13.0	—	25.1	—	—	51.9	—	103.1
White spruce	47.2	—	12.7	13.1	12.6	24.5	7.9	10.4	24.9	153.3
Spruce-fir	2,369.0	336.2	64.1	472.0	881.6	1,292.2	1,046.4	850.3	637.6	7,949.4
White pine-red oak-white ash	25.9	—	63.9	23.5	12.8	23.2	25.8	10.3	—	185.4
Northern red oak	—	49.7	118.2	13.2	—	—	—	21.0	38.4	240.5
Mixed hardwoods	—	12.4	—	—	—	—	—	—	—	12.4
Oak and oak-pine	25.9	62.1	182.1	36.7	12.8	23.2	25.8	31.3	38.4	438.3
Red maple	—	12.4	—	—	—	—	—	—	—	12.4
Black ash-elm-red maple	180.0	211.1	218.5	90.2	252.3	123.7	174.9	133.9	317.2	1,701.8
Elm-ash-red maple	180.0	223.5	218.5	90.2	252.3	123.7	174.9	133.9	317.2	1,714.2
Sugar maple-beech-birch	838.4	125.5	66.4	92.0	338.6	566.7	681.0	82.9	744.1	3,535.6
Black cherry	—	—	13.3	—	—	12.4	—	—	—	25.7
Maple-beech-birch	838.4	125.5	79.7	92.0	338.6	579.1	681.0	82.9	744.1	3,561.3
Aspen	224.4	61.6	63.8	24.7	38.3	35.5	136.0	114.4	100.5	799.2
Paper birch	36.9	12.5	49.7	43.7	12.6	37.7	62.9	103.1	63.2	422.3
Gray birch	—	24.8	51.9	13.2	62.5	—	24.3	20.9	—	197.6
Aspen-birch	261.3	98.9	165.4	81.6	113.4	73.2	223.2	238.4	163.7	1,419.1
All forest types	3,746.3	1,132.2	1,288.1	862.7	1,852.6	2,178.2	2,232.7	1,439.0	2,162.5	16,894.3

Table 41.—*Number of growing-stock trees and rough and rotten trees on commercial forest land in Maine, by diameter-class groups, softwoods and hardwoods, and geographic units, 1971*

[In thousands of trees]

Geographic unit	Softwoods (D.b.h. group in inches)				Hardwoods (D.b.h. group in inches)			
	5.0-8.9	9.0-18.9	19.0+	Total	5.0-10.9	11.0-18.9	19.0+	Total
				GROWING-STOCK TREES				
Aroostook County	467,164	126,003	1,384	594,551	130,193	29,135	1,912	161.240
Capitol region	73,487	16,922	639	91,048	64,108	6,610	381	71,099
Casco Bay	59,381	30,919	985	91,285	62,475	6,360	292	69,127
Hancock County	80,104	21,763	219	102,086	34,020	3,135	140	37,295
Penobscot County	209,930	48,042	824	258,796	79,723	13,088	823	93,634
Piscataquis County	318,459	66,341	1,653	386,453	91,986	17,337	1,952	111,275
Somerset County	289,105	54,198	586	343,889	116,880	19,374	1,684	137,938
Washington County	158,250	30,882	407	189,539	61,489	6,554	146	68,189
Western Maine	167,743	39,639	631	208,013	134,360	20,280	1,233	155,873
State total	1,823,623	434,709	7,328	2,265,660	775,234	121,873	8,563	905,670
				ROUGH AND ROTTEN TREES				
Aroostook County	35,431	26,936	795	63,162	47,742	11,026	1,665	60,433
Capitol region	8,734	2,114	103	10,951	15,788	1,681	293	17,762
Casco Bay	5,499	3,404	288	9,191	19,203	2,948	339	22,490
Hancock County	6,569	2,866	98	9,533	12,447	1,694	115	14,256
Penobscot County	22,124	12,230	559	34,913	31,266	6,177	709	38,152
Piscataquis County	28,079	15,633	491	44,203	31,362	7,333	1,275	39,970
Somerset County	18,335	12,490	419	31,244	33,152	6,698	1,333	41,183
Washington County	19,838	6,395	183	26,416	28,773	5,014	266	34,053
Western Maine	10,932	7,944	105	18,981	42,744	8,500	1,351	52,595
State total	155,541	90,012	3,041	248,594	262,477	51,071	7,346	320,894

Table 42.—*Net volume of timber on commercial forest land in Maine, by classes of timber and geographic units, 1971*

[In millions of cubic feet]

Geographic unit	Sawtimber trees			Pole-timber trees	Total growing stock	Rough trees	Rotten trees	Total, all timber
	Sawlogs	Upper stems	Total					
Aroostook County	2,068.8	361.1	2,429.9	2,829.1	5,259.0	274.7	346.6	5,880.3
Capitol region	354.7	62.6	417.3	639.1	1,056.4	73.1	38.1	1,167.6
Casco Bay	594.6	91.6	686.2	641.0	1,327.2	104.1	39.5	1,470.8
Hancock County	308.2	51.5	359.7	498.6	858.3	66.1	30.3	954.7
Penobscot County	865.2	149.4	1,014.6	1,289.6	2,304.2	193.9	331.5	2,829.6
Piscataquis County	1,227.3	206.0	1,433.3	1,965.1	3,398.4	208.8	183.3	3,790.5
Somerset County	925.7	173.0	1,098.7	1,885.3	2,984.0	178.5	171.4	3,333.9
Washington County	507.3	89.3	596.6	1,052.3	1,648.9	119.9	122.6	1,891.4
Western Maine	860.6	162.7	1,023.3	1,393.7	2,417.0	170.5	155.5	2,743.0
State total	7,712.4	1,347.2	9,059.6	12,193.8	21,253.4	1,389.6	1,418.8	24,061.8

Table 43.—*Volume of growing stock on commercial forest land in Maine, by ownership classes, softwoods and hardwoods, and geographic units, 1971*

[In millions of cubic feet]

Geographic unit	Public[1]			Forest industry			Other private			Total
	Soft-woods	Hard-woods	Total	Soft-woods	Hard-woods	Total	Soft-woods	Hard-woods	Total	
Aroostook County	72.0	35.6	107.6	2,431.6	755.6	3,187.2	1,468.7	495.5	1,964.2	5,259.0
Capitol region	4.9	3.2	8.1	5.3	4.1	9.4	591.6	447.3	1,038.9	1,056.4
Casco Bay	14.5	6.7	21.2	10.8	16.6	27.4	852.6	426.0	1,278.6	1,327.2
Hancock County	7.6	2.6	10.2	253.3	120.2	373.5	380.6	94.0	474.6	858.3
Penobscot County	34.6	—	34.6	1,042.7	391.0	1,433.7	539.5	296.4	835.9	2,304.2
Piscataquis County	26.7	5.3	32.0	1,463.8	490.6	1,954.4	1,029.2	382.8	1,412.0	3,398.4
Somerset County	7.5	6.9	14.4	1,437.1	538.3	1,975.4	576.0	418.2	994.2	2,984.0
Washington County	66.7	.9	67.6	822.8	310.8	1,133.6	302.3	145.4	447.7	1,648.9
Western Maine	29.6	71.2	100.8	916.4	656.9	1,573.3	374.8	368.1	742.9	2,417.0
State total	264.1	132.4	396.5	8,383.8	3,284.1	11,667.9	6,115.3	3,073.7	9,189.0	21,253.4

[1]Includes 65.8 million cubic feet in National Forest ownership in Western Maine unit.

Table 44.—*Volume of sawtimber on commercial forest land in Maine, by ownership classes, softwoods, and hardwoods, and geographic units, 1971*

[In millions of board feet][1]

Geographic unit	Public[2]			Forest industry			Other private			Total
	Soft-woods	Hard-woods	Total	Soft-woods	Hard-woods	Total	Soft-woods	Hard-woods	Total	
Aroostook County	104.9	57.6	162.5	3,929.9	1,701.1	5,631.0	2,349.8	717.3	3,067.1	8,860.6
Capitol region	10.5	4.4	14.9	6.2	6.1	12.3	1,219.1	641.3	1,860.4	1,887.6
Casco Bay	32.3	—	32.3	27.8	17.8	45.6	2,255.3	550.9	2,806.2	2,884.1
Hancock County	13.8	2.8	16.6	461.7	195.0	656.7	690.2	35.2	725.4	1,398.7
Penobscot County	7.9	—	7.9	1,557.1	764.3	2,321.4	740.8	302.0	1,042.8	3,372.1
Piscataquis County	10.9	6.8	17.7	2,216.1	1,171.9	3,388.0	1,532.0	887.8	2,419.8	5,825.5
Somerset County	9.8	9.9	19.7	1,812.0	1,123.9	2,935.9	740.2	650.9	1,391.1	4,346.7
Washington County	82.5	—	82.5	1,290.9	436.5	1,727.4	374.6	130.4	505.0	2,314.9
Western Maine	47.4	127.4	174.8	1,312.9	1,034.0	2,346.9	619.3	488.5	1,107.8	3,629.5
State total	320.0	208.9	528.9	12,614.6	6,450.6	19,065.2	10,521.3	4,404.3	14,925.6	34,519.7

[1]International ¼-inch rule.
[2]Includes 144.7 million board feet in National Forest ownership in Western Maine unit.

Table 45.—*Volume of growing stock on commercial forest land in Maine, by stand-size classes, softwoods and hardwoods, and geographic units, 1971*

[In millions of cubic feet]

Geographic unit	Sawtimber stands			Poletimber stands			Other stands			Total
	Soft-woods	Hard-woods	Total	Soft-woods	Hard-woods	Total	Soft-woods	Hard-woods	Total	
Aroostook County	2,459.0	746.0	3,205.0	1,178.3	349.9	1,528.2	335.0	190.8	525.8	5,259.0
Capitol region[1]	215.5	155.9	371.4	189.7	96.8	286.5	196.6	201.9	398.5	1,056.4
Casco Bay[1]	560.8	144.1	704.9	146.8	213.7	360.5	170.3	91.5	261.8	1,327.2
Hancock County	310.3	61.6	371.9	222.2	71.4	293.6	109.0	83.8	192.8	858.3
Penobscot County	949.8	361.9	1,311.7	504.4	215.7	720.1	162.6	109.8	272.4	2,304.2
Piscataquis County	1,467.5	466.4	1,933.9	897.9	316.8	1,214.7	154.3	95.5	249.8	3,398.4
Somerset County	878.6	421.8	1,300.4	990.4	390.2	1,380.6	151.6	151.4	303.0	2,984.0
Washington County	472.9	172.1	645.0	579.1	236.4	815.5	139.8	48.6	188.4	1,648.9
Western Maine[1]	495.1	382.8	877.9	705.8	541.0	1,246.8	119.9	172.4	292.3	2,417.0
State total	7,809.5	2,912.6	10,722.1	5,414.6	2,431.9	7,846.5	1,539.1	1,145.7	2,684.8	21,253.4

[1]For county breakdowns of stand-size classes in these units see table 99.

Table 46.—*Volume of sawtimber on commercial forest land in Maine, by stand-size classes, softwoods and hardwoods, and geographic units, 1971*

[In millions of board feet][1]

Geographic unit	Sawtimber stands			Poletimber stands			Other stands			Total
	Softwoods	Hardwoods	Total	Softwoods	Hardwoods	Total	Softwoods	Hardwoods	Total	
Aroostook County	4,962.5	1,824.8	6,787.3	1,058.3	443.6	1,501.9	363.8	207.6	571.4	8,860.6
Capitol region[2]	714.5	339.5	1,054.0	220.9	125.7	346.6	300.4	186.6	487.0	1,887.6
Casco Bay[2]	1,670.2	262.8	1,933.0	274.9	196.3	471.2	370.3	109.6	479.9	2,884.1
Hancock County	751.2	129.4	880.6	258.3	36.3	294.6	156.2	67.3	223.5	1,398.7
Penobscot County	1,744.0	807.6	2,551.6	418.9	176.2	595.1	142.9	82.5	225.4	3,372.1
Piscataquis County	2,820.0	1,432.4	4,252.4	811.0	411.9	1,222.9	128.0	222.2	350.2	5,825.5
Somerset County	1,514.8	1,211.4	2,726.2	869.9	403.4	1,273.3	177.3	169.9	347.2	4,346.7
Washington County	1,040.7	340.0	1,380.7	612.5	209.3	821.8	94.8	17.6	112.4	2,314.9
Western Maine[2]	1,122.4	862.1	1,984.5	693.4	547.3	1,240.7	163.8	240.5	404.3	3,629.5
State total	16,340.3	7,210.0	23,550.3	5,218.1	2,550.0	7,768.1	1,897.5	1,303.8	3,201.3	34,519.7

[1]International ¼-inch rule.
[2]For county breakdowns of stand-size classes in these units see table 100.

Table 47.—*Volume of growing stock on commercial forest land in Maine, by forest-type groups and geographic units, 1971*

[In millions of cubic feet]

Geographic unit	Forest-type group						
	White pine-red pine-hemlock	Spruce-fir	Oak and oak-pine	Elm-ash-red maple	Maple-beech-birch	Aspen-birch	Total
Aroostook County	148.3	3,725.8	32.3	158.5	909.0	285.1	5,259.0
Capitol region[1]	321.9	304.5	54.7	185.5	124.7	65.1	1,056.4
Casco Bay[1]	791.0	95.6	178.1	116.1	86.3	60.1	1,327.2
Hancock County	104.6	528.0	33.3	53.1	84.6	54.7	858.3
Penobscot County	426.3	1,161.7	21.2	248.5	407.6	38.9	2,304.2
Piscataquis County	150.4	2,321.0	25.0	157.1	674.6	70.3	3,398.4
Somerset County	67.0	1,792.3	26.9	150.5	767.7	179.6	2,984.0
Washington County	183.0	1,067.0	31.6	115.3	71.4	180.6	1,648.9
Western Maine[1]	328.4	848.4	62.6	265.7	668.3	243.6	2,417.0
State total	2,520.9	11,844.3	465.7	1,450.3	3,794.2	1,178.0	21,253.4

[1]For county breakdowns of forest-type groups in these units see table 101.

Table 48.—*Volume of sawtimber on commercial forest land in Maine, by forest-type groups and geographic units, 1971*

[In millions of board feet][1]

Geographic unit	Forest-type group						
	White pine-red pine-hemlock	Spruce-fir	Oak and oak-pine	Elm-ash-red maple	Maple-beech-birch	Aspen-birch	Total
Aroostook County	336.4	5,961.1	39.3	285.1	1,939.2	299.5	8,860.6
Capitol region[2]	782.3	384.9	116.6	352.4	164.1	87.3	1,887.6
Casco Bay[2]	2,004.4	181.5	309.4	178.1	129.8	80.9	2,884.1
Hancock County	227.5	892.9	27.6	50.3	149.8	50.6	1,398.7
Penobscot County	854.5	1,399.4	15.5	364.9	716.6	21.2	3,372.1
Piscataquis County	211.5	3,602.4	13.6	260.7	1,645.3	92.0	5,825.5
Somerset County	138.6	2,222.0	30.9	160.6	1,602.5	192.1	4,346.7
Washington County	378.0	1,383.1	55.3	134.3	138.9	225.3	2,314.9
Western Maine[2]	667.5	1,040.7	142.0	372.9	1,147.4	259.0	3,629.5
State total	5,600.7	17,068.0	750.2	2,159.3	7,633.6	1,307.9	34,519.7

[1]International ¼-inch rule.
[2]For county breakdowns of forest-type groups in these units see table 102.

Table 49.—*Number of growing-stock trees in the AROOSTOOK COUNTY UNIT, by species and diameter classes, 1971*

[In thousands of trees]

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine	2,437	574	537	182	203	312	130	223	89	178	9
White spruce[1]	44,050	21,056	13,750	5,842	2,062	699	387	224	21	9	—
Red spruce	145,411	61,547	40,252	21,676	11,716	5,821	2,586	1,159	411	243	—
Balsam fir	324,096	182,618	93,600	34,892	9,778	2,534	521	117	36	—	—
Hemlock	8,603	2,881	1,911	1,412	1,034	631	187	238	127	182	—
No. white-cedar	67,119	28,777	18,334	11,236	5,403	1,955	1,041	294	20	59	—
Other softwoods	2,835	333	994	744	588	139	37	—	—	—	—
Total softwoods	594,551	297,786	169,378	75,984	30,784	12,091	4,889	2,255	704	671	9
Yellow birch	17,607	5,384	5,573	2,614	1,899	1,072	520	222	218	105	—
Paper birch	19,975	14,015	2,186	2,309	925	358	96	57	—	29	—
Sugar maple	31,465	12,502	5,670	5,302	2,242	2,035	1,799	597	631	678	9
Soft maples	27,949	11,868	7,462	3,456	2,465	1,546	847	153	106	46	—
Beech	20,284	5,868	5,576	3,390	3,097	1,516	475	332	19	11	—
White ash[2]	8,233	3,445	2,277	999	926	319	219	24	24	—	—
Aspen	30,832	13,453	7,362	5,554	2,837	1,086	347	176	17	—	—
Other hardwoods[3]	4,895	2,176	1,099	653	582	246	71	49	19	—	—
Total hardwoods	161,240	68,711	37,205	24,277	14,973	8,178	4,374	1,610	1,034	869	9
All species	755,791	366,497	206,583	100,261	45,757	20,269	9,263	3,865	1,738	1,540	18

[1]Includes 7,724 thousand black spruce trees.
[2]Includes 4,379 thousand black ash trees.
[3]Includes 2,825 thousand balsam poplar trees, 345 basswood, 1,221 elm, and 504 black cherry.

Table 50.—*Number of growing-stock trees in the CAPITOL REGION UNIT, by species and diameter classes, 1971*

[In thousands of trees]

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	17,083	6,513	3,916	2,809	1,403	1,108	606	162	287	240	39
White spruce[2]	7,055	4,233	1,980	464	211	92	34	—	21	20	—
Red spruce	12,467	5,922	4,419	1,202	654	232	38	—	—	—	—
Balsam fir	29,430	21,949	5,914	1,362	205	—	—	—	—	—	—
Hemlock	13,515	5,846	3,055	2,198	1,439	507	406	32	24	—	8
No. white-cedar	10,325	5,836	3,090	910	449	40	—	—	—	—	—
Other softwoods	1,173	541	273	201	73	85	—	—	—	—	—
Total softwoods	91,048	50,840	22,647	9,146	4,434	2,064	1,084	194	332	260	47
Red oaks	4,729	1,720	978	735	678	430	107	29	42	—	10
Yellow birch	2,575	1,073	511	375	246	169	142	26	—	33	—
Paper birch	8,911	4,404	2,363	1,425	459	198	39	—	23	—	—
Sugar maple	5,624	2,276	2,078	769	253	98	68	82	—	—	—
Soft maples	25,621	13,571	8,088	2,320	902	497	106	81	43	—	13
Beech	2,139	1,150	642	198	58	91	—	—	—	—	—
White ash[3]	5,429	3,250	1,329	451	275	93	31	—	—	—	—
Aspen	6,172	2,919	2,353	572	278	50	—	—	—	—	—
Other hardwoods[4]	9,899	5,552	2,025	981	667	130	181	146	115	78	24
Total hardwoods	71,099	35,915	20,367	7,826	3,816	1,756	674	364	223	111	47
All species	162,147	86,755	43,014	16,972	8,250	3,820	1,758	558	555	371	94

[1]Includes 614 thousand red pine trees.
[2]Includes 4,382 thousand black spruce trees.
[3]Includes 1,890 thousand black ash trees.
[4]Includes 3,567 thousand elm trees.

Table 51.—*Number of growing-stock trees in the CASCO BAY UNIT, by species and diameter classes, 1971*

[In thousands of trees]

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	50,906	14,915	14,482	7,736	6,463	3,508	1,937	990	332	473	70
Black spruce	1,021	715	306	—	—	—	—	—	—	—	—
Red spruce	6,621	1,463	3,185	1,639	182	89	39	—	24	—	—
Balsam fir	4,139	3,109	635	281	114	—	—	—	—	—	—
Hemlock	27,121	11,334	7,760	4,351	1,512	1,179	648	251	47	39	—
No. white-cedar	383	263	120	—	—	—	—	—	—	—	—
Other softwoods	1,094	971	123	—	—	—	—	—	—	—	—
Total softwoods	91,285	32,770	26,611	14,007	8,271	4,776	2,624	1,241	403	512	70
Red oaks[2]	15,521	5,561	4,521	1,886	1,785	886	493	225	66	90	8
Yellow birch[3]	5,144	2,919	889	905	269	133	—	29	—	—	—
Paper birch	7,945	4,310	2,015	1,077	409	93	32	—	—	—	9
Sugar maple	1,595	738	746	—	—	—	—	57	—	54	—
Soft maples	23,581	13,669	6,181	2,305	861	386	142	26	—	—	11
Beech	7,472	3,896	2,723	563	67	99	107	—	—	17	—
White ash[4]	1,249	566	417	174	55	—	—	—	21	—	16
Aspen	4,772	2,324	1,913	463	72	—	—	—	—	—	—
Other hardwoods[5]	1,848	646	1,068	—	66	—	68	—	—	—	—
Total hardwoods	69,127	34,629	20,473	7,373	3,584	1,597	842	337	87	161	44
All species	160,412	67,399	47,084	21,380	11,855	6,373	3,466	1,578	490	673	114

[1]Includes 1,449 thousand red pine trees.
[2]Includes 159 thousand white oak trees.
[3]Includes 1,405 thousand sweet birch trees.
[4]Includes 222 thousand black ash trees.
[5]Includes 1,061 thousand elm trees.

Table 52.—*Number of growing-stock trees in the HANCOCK COUNTY UNIT, by species and diameter classes, 1971*

[In thousands of trees]

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	2,495	754	401	733	—	215	247	21	64	42	18
White spruce[2]	4,940	2,137	1,484	886	360	34	39	—	—	—	—
Red spruce	37,213	17,155	9,611	6,469	2,262	995	459	183	47	32	—
Balsam fir	27,922	22,163	4,778	839	142	—	—	—	—	—	—
Hemlock	9,074	3,519	2,325	933	1,151	696	405	29	—	16	—
No. white-cedar	19,099	7,467	7,335	3,056	881	360	—	—	—	—	—
Other softwoods	1,343	262	713	201	114	53	—	—	—	—	—
Total softwoods	102,086	53,457	26,647	13,117	4,910	2,353	1,150	233	111	90	18
Red oaks	2,985	2,277	407	190	57	54	—	—	—	—	—
Yellow birch	1,244	485	285	80	252	48	40	27	27	—	—
Paper birch	10,571	6,788	2,595	821	326	41	—	—	—	—	—
Sugar maple	2,405	1,086	735	367	191	—	—	—	—	11	15
Soft maples	13,715	5,722	5,261	1,321	739	321	234	56	41	20	—
Beech	2,394	1,049	765	321	146	33	59	21	—	—	—
White ash	1,948	671	893	62	151	79	66	—	—	26	—
Aspen	2,007	269	1,227	343	168	—	—	—	—	—	—
Other hardwoods	26	—	—	—	—	—	26	—	—	—	—
Total hardwoods	37,295	18,347	12,168	3,505	2,030	576	425	104	68	57	15
All species	139,381	71,804	38,815	16,622	6,940	2,929	1,575	337	179	147	33

[1]Includes 107 thousand red pine trees.
[2]Includes 1,305 thousand black spruce trees.

Table 53.—*Number of growing-stock trees in the PENOBSCOT COUNTY UNIT, by species and diameter classes, 1971*

[In thousands of trees]

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	7,851	2,885	1,319	862	532	791	687	375	150	194	56
White spruce[2]	12,710	6,868	4,319	1,034	374	50	65	—	—	—	—
Red spruce	67,768	33,235	18,147	9,763	3,998	1,869	577	135	44	—	—
Balsam fir	96,655	67,732	20,925	5,496	2,155	286	32	29	—	—	—
Hemlock	33,844	13,363	9,080	4,845	3,193	1,765	862	356	194	186	—
No. white-cedar	37,659	17,952	12,040	4,972	2,093	466	107	29	—	—	—
Other softwoods	2,309	1,473	592	153	53	—	38	—	—	—	—
Total softwoods	258,796	143,508	66,422	27,125	12,398	5,227	2,368	924	388	380	56
Red oaks	841	307	109	317	—	—	32	29	—	47	—
Yellow birch	7,794	2,790	1,254	1,949	1,138	259	239	135	—	30	—
Paper birch	8,949	4,675	2,342	1,078	311	312	166	28	23	14	—
Sugar maple	11,497	4,647	3,446	1,386	557	453	279	327	200	185	17
Soft maples	31,445	14,560	8,155	3,509	2,738	1,148	874	266	126	69	—
Beech	13,599	7,324	3,247	1,513	745	553	168	28	21	—	—
White ash[3]	5,214	1,799	1,315	1,122	373	273	243	75	—	14	—
Aspen	10,584	6,122	2,857	1,016	315	240	34	—	—	—	—
Other hardwoods[4]	3,711	1,582	985	317	507	214	—	29	22	48	7
Total hardwoods	93,634	43,806	23,710	12,207	6,684	3,452	2,035	917	392	407	24
All species	352,430	187,314	90,132	39,332	19,082	8,679	4,403	1,841	780	787	80

[1]Includes 590 thousand red pine trees.
[2]Includes 6,174 thousand black spruce trees.
[3]Includes 1,669 thousand black ash trees.
[4]Includes 1,921 thousand elm trees, 638 basswood, and 1,152 other hardwood species.

Table 54.—*Number of growing-stock trees in the PISCATAQUIS COUNTY UNIT, by species and diameter classes, 1971*

[In thousands of trees]

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	12,006	4,331	3,288	1,283	1,141	542	339	202	263	560	57
White spruce[2]	18,695	9,439	5,992	1,684	944	320	181	56	22	57	—
Red spruce	146,350	84,765	33,162	15,170	7,635	3,159	1,473	714	219	53	—
Balsam fir	165,152	105,444	42,611	13,540	3,058	468	31	—	—	—	—
Hemlock	9,581	4,474	2,184	1,150	894	302	162	213	67	135	—
No. white-cedar	34,035	11,036	11,156	5,875	3,435	1,389	626	298	42	158	20
Other softwoods	634	298	279	—	57	—	—	—	—	—	—
Total softwoods	386,453	219,787	98,672	38,702	17,164	6,180	2,812	1,483	613	963	77
Red oaks	628	465	—	—	—	39	—	49	61	14	—
Yellow birch	14,188	5,497	3,162	1,567	1,927	960	243	378	240	214	—
Paper birch	12,688	5,911	3,548	1,739	907	309	118	111	45	—	—
Sugar maple	20,764	7,870	3,309	3,162	1,788	1,727	1,000	918	455	526	9
Soft maples	27,204	14,234	6,892	3,227	1,215	1,027	310	191	19	89	—
Beech	20,206	9,038	5,138	3,832	945	677	342	82	84	68	—
White ash[3]	5,500	2,277	1,235	1,018	624	98	199	49	—	—	—
Aspen	7,957	4,631	1,772	1,103	305	90	—	56	—	—	—
Other hardwoods[4]	2,140	398	485	476	356	182	63	52	81	47	—
Total hardwoods	111,275	50,321	25,541	16,124	8,067	5,109	2,275	1,886	985	958	9
All species	497,728	270,108	124,213	54,826	25,231	11,289	5,087	3,369	1,598	1,921	86

[1]Includes 265 thousand red pine trees.
[2]Includes 8,143 thousand black spruce trees.
[3]Includes 2,304 thousand black ash trees.
[4]Includes 1,127 thousand elm trees, 304 basswood, and 709 other hardwood species.

Table 55.—*Number of growing-stock trees in the SOMERSET COUNTY UNIT, by species and diameter classes, 1971*

[In thousands of trees]

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	5,306	2,270	1,305	693	361	315	104	—	70	157	31
White spruce[2]	14,700	7,312	3,352	1,953	1,385	416	171	62	49	—	—
Red spruce	108,280	57,616	31,792	12,005	4,513	1,550	484	235	67	18	—
Balsam fir	178,973	102,428	57,150	14,786	3,955	591	37	26	—	—	—
Hemlock	10,121	3,991	2,735	1,903	631	463	199	127	47	25	—
No. white-cedar	25,685	11,605	7,062	3,289	1,774	1,142	408	283	74	48	—
Other softwoods	824	325	162	278	59	—	—	—	—	—	—
Total softwoods	343,889	185,547	103,558	34,907	12,678	4,477	1,403	733	307	248	31
Red oaks	93	—	—	93	—	—	—	—	—	—	—
Yellow birch	21,525	8,721	4,392	3,611	1,828	1,214	866	377	255	261	—
Paper birch	23,335	11,105	7,168	3,199	952	619	99	161	20	12	—
Sugar maple	24,416	9,064	4,717	2,888	3,340	1,641	1,222	635	438	471	—
Soft maples	35,985	18,054	9,342	5,976	1,171	819	417	133	56	17	—
Beech	10,624	3,756	3,123	1,922	888	436	391	54	49	5	—
White ash[3]	4,861	2,817	1,151	498	301	94	—	—	—	—	—
Aspen	13,499	6,065	3,916	2,469	682	269	98	—	—	—	—
Other hardwoods[4]	3,600	1,191	1,159	483	431	86	95	55	87	13	—
Total hardwoods	137,938	60,773	34,968	21,139	9,593	5,178	3,188	1,415	905	779	—
All species	481,827	246,320	138,526	56,046	22,271	9,655	4,591	2,148	1,212	1,027	31

[1]Includes 332 thousand red pine trees.
[2]Includes 1,979 thousand black spruce trees.
[3]Includes 1,742 thousand black ash trees.
[4]Includes 1,505 thousand elm trees, 1,515 basswood, and 580 other hardwood species.

Table 56.—*Number of growing-stock trees in the WASHINGTON COUNTY UNIT, by species and diameter classes, 1971*

[In thousands of trees]

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	3,587	338	674	657	676	426	306	198	180	119	13
White spruce[2]	9,481	6,223	2,475	430	219	75	59	—	—	—	—
Red spruce	70,152	35,690	19,959	8,735	3,857	1,407	318	136	35	15	—
Balsam fir	59,146	40,112	16,110	2,225	582	117	—	—	—	—	—
Hemlock	17,983	8,255	4,746	2,629	1,455	343	346	181	16	12	—
No. white-cedar	23,166	12,249	6,650	2,923	1,066	194	26	41	17	—	—
Other softwoods	6,024	2,988	1,781	828	151	276	—	—	—	—	—
Total softwoods	189,539	105,855	52,395	18,427	8,006	2,838	1,055	556	248	146	13
Red oaks	2,418	1,642	376	235	102	—	27	—	36	—	—
Yellow birch	3,656	1,210	1,672	361	217	79	59	23	35	—	—
Paper birch	14,499	7,171	4,313	2,024	661	280	28	22	—	—	—
Sugar maple	3,111	2,167	272	225	145	114	119	22	34	13	—
Soft maples	31,376	14,488	8,814	4,739	1,848	972	378	137	—	—	—
Beech	2,756	1,565	826	215	54	71	25	—	—	—	—
White ash[3]	1,972	1,000	—	444	218	119	163	—	—	28	—
Aspen	8,288	3,100	3,149	1,368	524	115	32	—	—	—	—
Other hardwoods	113	—	113	—	—	—	—	—	—	—	—
Total hardwoods	68,189	32,343	19,535	9,611	3,769	1,750	831	204	105	41	—
All species	257,728	138,198	71,930	28,038	11,775	4,588	1,886	760	353	187	13

[1]Includes 556 thousand red pine trees.
[2]Includes 6,918 thousand black spruce trees.
[3]Includes 1,097 thousand black ash trees.

Table 57.—*Number of growing-stock trees in the WESTERN MAINE UNIT, by species and diameter classes, 1971*

[In thousands of trees]

Species	All classes	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	16,921	4,722	4,232	2,614	2,618	1,197	859	224	195	234	26
White spruce[2]	10,384	5,515	2,690	1,208	817	50	67	—	23	14	—
Red spruce	54,733	28,726	16,106	6,334	1,960	1,005	313	232	22	35	—
Balsam fir	103,729	60,159	30,239	10,582	2,086	500	139	24	—	—	—
Hemlock	15,420	6,731	3,518	2,245	1,588	811	431	60	13	23	—
No. white-cedar	6,532	2,223	2,766	1,066	396	—	31	27	23	—	—
Other softwoods	294	—	116	—	—	124	31	—	23	—	—
Total softwoods	208,013	108,076	59,667	24,049	9,465	3,687	1,871	567	299	306	26
Red oaks[3]	6,473	2,064	1,831	1,239	445	444	73	175	116	86	—
Yellow birch	24,120	10,637	3,960	3,615	2,781	1,624	663	473	130	220	17
Paper birch	30,446	15,061	7,876	5,338	1,037	758	186	144	27	19	—
Sugar maple	20,603	9,712	3,986	2,818	1,608	1,181	482	470	181	165	—
Soft maples	35,275	16,658	10,518	4,306	2,171	862	414	168	96	82	—
Beech	18,991	10,905	4,251	2,244	955	302	281	24	13	16	—
White ash[4]	2,944	420	1,533	454	134	278	74	27	24	—	—
Aspen	15,535	4,895	6,703	2,287	1,068	305	141	136	—	—	—
Other hardwoods[5]	1,486	751	298	—	253	110	33	—	22	19	—
Total hardwoods	155,873	71,103	40,956	22,301	10,452	5,864	2,347	1,617	609	607	17
All species	363,886	179,179	100,623	46,350	19,917	9,551	4,218	2,184	908	913	43

[1]Includes 410 thousand red pine trees.
[2]Includes 99 thousand black spruce trees.
[3]Includes 815 thousand white oak trees.
[4]Includes 91 thousand black ash trees.
[5]Includes 439 thousand basswood trees, 450 elm, and 597 black cherry.

Table 58.—*Growing-stock volume in the AROOSTOOK COUNTY UNIT, by species and diameter classes, 1971*

[In millions of cubic feet]

Species	Total	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine	53.2	2.8	4.3	2.1	3.4	7.1	4.0	9.0	4.6	14.5	1.4
White spruce[1]	320.9	91.5	93.4	63.5	32.8	15.1	12.4	9.9	1.1	1.2	—
Red spruce	1,255.2	270.4	270.4	228.3	182.1	135.0	82.6	47.4	22.3	16.7	—
Balsam fir	1,844.1	650.9	595.6	363.0	155.4	56.7	16.1	4.6	1.8	—	—
Hemlock	84.2	10.9	10.2	12.4	12.3	11.4	4.5	7.7	4.9	9.9	—
No. white-cedar	382.2	86.2	89.9	84.6	58.8	29.2	22.1	8.2	.6	2.6	—
Other softwoods	32.5	.4	6.8	8.1	11.8	4.0	1.4	—	—	—	—
Total softwoods	3,972.3	1,113.1	1,070.6	762.0	456.6	258.5	143.1	86.8	35.3	44.9	1.4
Yellow birch	129.5	16.1	27.5	20.2	20.6	17.1	10.6	5.8	7.0	4.6	—
Paper birch	91.1	42.2	10.7	17.2	10.5	5.3	2.1	1.5	—	1.6	—
Sugar maple	337.1	42.7	33.6	49.4	32.9	41.6	49.8	20.6	27.4	38.4	.7
Soft maples	213.9	37.4	40.7	31.4	34.6	31.5	24.0	5.9	5.0	3.4	—
Beech	180.1	16.5	30.7	31.8	45.5	30.3	12.8	11.2	.7	.6	—
White ash[2]	66.0	10.7	13.8	10.2	15.4	7.2	6.7	.9	1.1	—	—
Aspen	231.7	42.9	44.3	57.4	44.9	24.5	10.8	6.2	.7	—	—
Other hardwoods[3]	37.3	5.8	5.8	6.4	8.6	5.2	2.8	1.7	1.0	—	—
Total hardwoods	1,286.7	214.3	207.1	224.0	213.0	162.7	119.6	53.8	42.9	48.6	.7
All species	5,259.0	1,327.4	1,277.7	986.0	669.6	421.2	262.7	140.6	78.2	93.5	2.1

[1]Includes 43.7 million cubic feet of black spruce.
[2]Includes 35.0 million cubic feet of black ash.
[3]Includes 22.1 million cubic feet of balsam poplar, 2.5 of basswood, 1.5 of black cherry and 11.2 of elm.

Table 59.—*Growing-stock volume in the CAPITOL REGION UNIT, by species and diameter classes, 1971*

[In millions of cubic feet]

Species	Total	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	188.6	32.5	27.9	28.2	20.4	22.1	16.5	6.0	13.3	16.3	5.4
White spruce[2]	45.3	17.8	12.8	5.0	3.4	2.2	1.2	—	1.4	1.5	—
Red spruce	84.7	25.1	28.8	13.3	11.0	5.5	1.0	—	—	—	—
Balsam fir	123.1	68.1	36.6	15.3	3.1	—	—	—	—	—	—
Hemlock	106.0	22.5	18.4	19.8	20.3	10.8	11.1	1.1	.9	—	1.1
No. white-cedar	46.6	17.9	15.5	7.3	5.2	.7	—	—	—	—	—
Other softwoods	7.5	1.0	1.4	1.8	1.0	2.3	—	—	—	—	—
Total softwoods	601.8	184.9	141.4	90.7	64.4	43.6	29.8	7.1	15.6	17.8	6.5
Red oaks	44.6	5.8	6.1	7.1	10.5	8.8	2.8	.8	1.8	—	.9
Yellow birch	22.1	3.3	2.6	3.5	3.6	3.3	3.6	.8	—	1.4	—
Paper birch	53.4	14.5	14.2	13.7	6.0	3.4	.9	—	.7	—	—
Sugar maple	42.3	8.1	15.1	8.3	3.8	2.1	2.0	2.9	—	—	—
Soft maples	142.9	41.3	47.1	22.0	13.3	9.8	2.7	3.0	1.9	—	1.8
Beech	11.7	3.6	4.1	1.5	.7	1.8	—	—	—	—	—
White ash[3]	30.6	9.9	8.9	4.6	4.2	2.0	1.0	—	—	—	—
Aspen	33.8	9.0	13.7	5.9	4.1	1.1	—	—	—	—	—
Other hardwoods[4]	73.2	17.2	11.8	9.9	10.1	3.3	4.6	4.3	4.9	4.4	2.7
Total hardwoods	454.6	112.7	123.6	76.5	56.3	35.6	17.6	11.8	9.3	5.8	5.4
All species	1,056.4	297.6	265.0	167.2	120.7	79.2	47.4	18.9	24.9	23.6	11.9

[1]Includes 4.5 million cubic feet of red pine.
[2]Includes 23.2 million cubic feet of black spruce.
[3]Includes 9.8 million cubic feet of black ash.
[4]Includes 37.9 million cubic feet of elm.
Note: For county breakdowns of species in this unit, see table 103.

Table 60.—*Growing-stock volume in the CASCO BAY UNIT, by species and diameter classes, 1971*

[In millions of cubic feet]

Species	Total	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	583.0	76.0	106.7	80.5	97.5	73.1	54.6	35.9	16.0	33.9	8.8
Black spruce	5.3	3.2	2.1	—	—	—	—	—	—	—	—
Red spruce	54.2	6.4	22.6	17.3	3.2	2.2	1.2	—	1.3	—	—
Balsam fir	19.0	10.0	3.7	3.2	2.1	—	—	—	—	—	—
Hemlock	212.2	45.1	47.1	40.8	22.2	24.2	18.8	9.5	2.3	2.2	—
No. white-cedar	1.4	.8	.6	—	—	—	—	—	—	—	—
Other softwoods	2.8	2.1	.7	—	—	—	—	—	—	—	—
Total softwoods	877.9	143.6	183.5	141.8	125.0	99.5	74.6	45.4	19.6	36.1	8.8
Red oaks[2]	140.1	18.6	27.5	20.1	26.6	18.1	13.0	7.9	2.8	4.5	1.0
Yellow birch[3]	31.4	10.2	5.4	8.5	3.6	2.8	—	.9	—	—	—
Paper birch	47.2	14.8	12.9	10.7	5.4	1.7	.8	—	—	—	.9
Sugar maple	13.3	2.6	5.1	—	—	—	—	2.1	—	3.5	—
Soft maples	131.0	44.2	36.8	24.2	12.1	7.7	3.7	.8	—	—	1.5
Beech	40.2	12.8	15.8	5.2	.9	1.9	2.8	—	—	.8	—
White ash[4]	9.8	1.6	2.8	2.0	1.0	—	—	—	1.0	—	1.4
Aspen	25.8	7.8	12.1	4.8	1.1	—	—	—	—	—	—
Other hardwoods	10.5	2.2	5.2	—	1.3	—	1.8	—	—	—	—
Total hardwoods	449.3	114.8	123.6	75.5	52.0	32.2	22.1	11.7	3.8	8.8	4.8
All species	1,327.2	258.4	307.1	217.3	177.0	131.7	96.7	57.1	23.4	44.9	13.6

[1]Includes 9.0 million cubic feet of red pine.
[2]Includes 3.5 million cubic feet of white oaks.
[3]Includes 6.9 million cubic feet of sweet birch.
[4]Includes 2.0 million cubic feet of black ash.
Note: For county breakdowns of species in this unit, see table 103.

Table 61.—*Growing-stock volume in the HANCOCK COUNTY UNIT, by species and diameter classes, 1971*

[In millions of cubic feet]

Species	Total	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	32.7	3.7	2.5	7.3	—	4.1	6.2	0.8	2.8	3.4	1.9
White spruce[2]	36.2	8.7	10.3	9.1	6.0	.9	1.2	—	—	—	—
Red spruce	285.5	70.0	62.6	67.3	36.1	22.3	14.6	7.7	2.7	2.2	—
Balsam fir	105.2	66.8	27.6	8.8	2.0	—	—	—	—	—	—
Hemlock	75.9	12.7	13.4	8.0	16.0	13.3	10.6	1.0	—	.9	—
No. white-cedar	97.6	23.2	36.5	23.0	9.5	5.4	—	—	—	—	—
Other softwoods	8.4	.4	3.1	1.9	1.9	1.1	—	—	—	—	—
Total softwoods	641.5	185.5	156.0	125.4	71.5	47.1	32.6	9.5	5.5	6.5	1.9
Red oaks	13.6	7.0	2.5	1.8	.9	1.4	—	—	—	—	—
Yellow birch	10.5	1.4	1.6	.7	3.4	.9	.7	.8	1.0	—	—
Paper birch	46.4	20.1	14.0	7.4	4.2	.7	—	—	—	—	—
Sugar maple	15.5	3.4	4.2	3.5	2.7	—	—	—	—	.6	—
Soft maples	85.2	17.3	29.3	12.6	10.0	6.2	6.1	1.6	1.4	.7	—
Beech	14.5	3.5	4.0	2.4	1.8	.6	1.6	.6	—	—	—
White ash	15.4	2.2	5.4	.8	2.2	1.6	1.8	—	—	1.4	—
Aspen	14.6	.8	7.9	3.3	2.6	—	—	—	—	—	—
Other hardwoods	1.1	—	—	—	—	—	1.1	—	—	—	—
Total hardwoods	216.8	55.7	68.9	32.5	27.8	11.4	11.3	3.0	2.4	2.7	1.1
All species	858.3	241.2	224.9	157.9	99.3	58.5	43.9	12.5	7.9	9.2	3.0

[1]Includes 1.2 million cubic feet of red pine.
[2]Includes 7.1 million cubic feet of black spruce.

Table 62.—*Growing-stock volume in the PENOBSCOT COUNTY UNIT, by species and diameter classes, 1971*

[In millions of cubic feet]

Species	Total	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	123.4	13.4	9.8	9.3	8.7	18.0	20.4	15.3	7.8	13.7	7.0
White spruce[2]	72.8	24.9	27.1	11.3	6.2	1.1	2.2	—	—	—	—
Red spruce	476.7	124.4	114.1	103.5	63.5	43.8	19.1	5.8	2.5	—	—
Balsam fir	474.1	250.8	130.2	54.9	30.8	5.6	.9	.9	—	—	—
Hemlock	279.5	51.1	52.0	42.3	42.6	34.5	22.9	12.5	9.1	12.5	—
No. white-cedar	180.0	51.4	58.1	37.7	23.3	6.9	2.0	.6	—	—	—
Other softwoods	10.3	3.8	2.9	1.6	.9	—	1.1	—	—	—	—
Total softwoods	1,616.8	519.8	394.2	260.6	176.0	109.9	68.6	35.1	19.4	26.2	7.0
Red oaks	12.7	.9	1.0	3.0	—	—	1.5	1.3	—	5.0	—
Yellow birch	60.1	8.7	6.3	15.5	13.6	4.8	5.5	4.1	—	1.6	—
Paper birch	52.9	15.6	12.6	9.3	3.7	5.3	4.1	.8	.7	.8	—
Sugar maple	117.9	17.8	20.6	14.1	8.3	9.5	8.0	13.3	10.4	13.7	2.2
Soft maples	231.2	40.4	44.5	34.2	41.0	25.3	25.7	10.2	6.2	3.7	—
Beech	73.9	20.4	15.9	12.3	9.4	9.7	4.3	1.0	.9	—	—
White ash[3]	50.3	5.1	8.6	12.6	6.0	6.2	7.7	3.2	—	.9	—
Aspen	56.0	17.6	16.2	11.1	4.9	5.2	1.0	—	—	—	—
Other hardwoods[4]	32.4	4.1	4.6	2.6	8.8	4.6	—	.8	.9	4.5	1.5
Total hardwoods	687.4	130.6	130.3	114.7	95.7	70.6	57.8	34.7	19.1	30.2	3.7
All species	2,304.2	650.4	524.5	375.3	271.7	180.5	126.4	69.8	38.5	56.4	10.7

[1]Includes 4.0 million cubic feet of red pine.
[2]Includes 31.5 million cubic feet of black spruce.
[3]Includes 22.2 million cubic feet of black ash.
[4]Includes 17.7 million cubic feet of elm, 9.8 of basswood, and 4.9 of other hardwood species.

Table 63.—*Growing-stock volume in the PISCATAQUIS COUNTY UNIT, by species and diameter classes, 1971*

[In millions of cubic feet]

Species	Total	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	189.0	22.3	26.0	13.8	17.6	12.7	11.3	8.4	14.4	52.7	9.8
White spruce[2]	136.8	43.3	41.4	17.5	15.2	7.2	5.5	2.1	1.0	3.6	—
Red spruce	1,047.4	382.5	231.2	158.7	116.0	69.0	46.6	28.3	11.2	3.9	—
Balsam fir	836.0	370.6	274.2	137.4	43.9	9.1	.8	—	—	—	—
Hemlock	77.4	16.8	12.2	9.9	11.8	5.7	4.4	7.2	2.7	6.7	—
No. white-cedar	230.0	30.8	54.9	46.6	40.8	23.1	14.1	8.7	1.5	7.2	2.3
Other softwoods	3.1	.7	1.5	—	.9	—	—	—	—	—	—
Total softwoods	2,519.7	867.0	641.4	383.9	246.2	126.8	82.7	54.7	30.8	74.1	12.1
Red oaks	10.9	1.6	—	—	—	1.3	—	2.9	3.7	1.4	—
Yellow birch	118.4	16.6	17.1	12.3	24.1	15.2	5.8	10.5	7.5	9.3	—
Paper birch	78.0	19.8	19.3	14.8	11.5	5.2	2.5	3.4	1.5	—	—
Sugar maple	250.0	28.8	20.2	30.9	26.2	36.7	26.2	31.5	19.0	29.8	0.7
Soft maples	167.7	46.1	39.1	30.1	15.5	17.8	7.8	6.1	1.1	4.1	—
Beech	139.8	32.1	30.5	33.7	12.6	12.1	8.2	2.6	3.5	4.5	—
White ash[3]	41.9	6.8	7.4	9.2	8.7	2.0	5.8	2.0	—	—	—
Aspen	41.3	12.8	10.3	10.0	4.7	1.8	—	1.7	—	—	—
Other hardwoods[4]	30.7	1.1	2.6	3.5	5.2	4.4	2.8	2.1	5.9	3.1	—
Total hardwoods	878.7	165.7	146.5	144.5	108.5	96.5	59.1	62.8	42.2	52.2	.7
All species	3,398.4	1,032.7	787.9	528.4	354.7	223.3	141.8	117.5	73.0	126.3	12.8

[1]Includes 3.4 million cubic feet of red pine.
[2]Includes 49.1 million cubic feet of black spruce.
[3]Includes 15.5 million cubic feet of black ash.
[4]Includes 16.0 million cubic feet of elm, 11.0 of basswood, and 3.7 other hardwood species.

Table 64.—*Growing-stock volume in the SOMERSET COUNTY UNIT by species and diameter classes, 1971*

[In millions of cubic feet]

Species	Total	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	52.5	10.1	8.5	6.4	5.0	5.7	2.5	—	3.0	8.6	2.7
White spruce[2]	112.6	30.3	21.9	20.5	20.9	9.2	5.2	2.2	2.4	—	—
Red spruce	692.1	235.6	204.9	123.8	68.1	32.6	14.4	8.6	3.1	1.0	—
Balsam fir	940.3	371.8	349.6	149.2	56.1	11.7	1.1	.8	—	—	—
Hemlock	74.3	15.4	15.3	15.7	7.4	8.4	4.7	4.3	1.8	1.3	—
No. white-cedar	143.8	32.4	31.5	24.9	18.6	15.8	8.5	7.4	2.7	2.0	—
Other softwoods	5.0	.7	.9	2.3	1.1	—	—	—	—	—	—
Total softwoods	2,020.6	696.3	632.6	342.8	177.2	83.4	36.4	23.3	13.0	12.9	2.7
Red oaks	1.0	—	—	1.0	—	—	—	—	—	—	—
Yellow birch	160.2	28.4	21.9	27.4	19.9	18.9	17.4	9.1	7.7	9.5	—
Paper birch	121.0	35.4	34.3	24.3	10.6	9.4	1.9	3.9	.7	.5	—
Sugar maple	250.9	31.9	26.0	26.1	45.6	31.4	30.4	19.6	16.8	23.1	—
Soft maples	206.8	58.8	47.6	50.5	15.5	15.2	11.2	4.6	2.2	1.2	—
Beech	75.2	10.8	15.8	15.0	11.3	8.2	10.1	1.8	2.0	.2	—
White ash[3]	26.3	8.8	6.4	4.7	4.3	2.1	—	—	—	—	—
Aspen	83.0	19.1	22.1	23.9	9.7	5.6	2.6	—	—	—	—
Other hardwoods[4]	39.0	4.4	6.9	4.9	7.1	2.9	3.3	2.0	7.0	.5	—
Total hardwoods	963.4	197.6	181.0	177.8	124.0	93.7	76.9	41.0	36.4	35.0	—
All species	2,984.0	893.9	813.6	520.6	301.2	177.1	113.3	64.3	49.4	47.9	2.7

[1]Includes 2.0 million cubic feet of red pine.
[2]Includes 10.7 million cubic feet of black spruce.
[3]Includes 9.0 million cubic feet of black ash.
[4]Includes 10.3 million cubic feet of elm, 23.3 of basswood, and 5.4 of other hardwood species.

Table 65.—Growing-stock volume in the WASHINGTON COUNTY UNIT, by species and diameter classes, 1971

[In millions of cubic feet]

Species	Total	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	73.9	2.0	5.4	7.9	11.8	10.5	10.6	8.7	9.5	6.9	0.6
White spruce[2]	55.7	25.8	18.0	4.9	3.4	1.7	1.9	—	—	—	—
Red spruce	510.1	153.4	141.3	97.8	64.9	33.8	10.3	5.8	1.9	.9	—
Balsam fir	274.6	144.0	97.4	22.1	8.7	2.4	—	—	—	—	—
Hemlock	129.6	33.0	28.7	24.2	20.1	6.5	9.4	6.3	.7	.7	—
No. white-cedar	113.0	38.4	33.4	22.3	13.0	3.2	.6	1.4	.7	—	—
Other softwoods	34.9	8.9	9.9	7.8	2.4	5.9	—	—	—	—	—
Total softwoods	1,191.8	405.5	334.1	187.0	124.3	64.0	32.8	22.2	12.8	8.5	.6
Red oaks	16.2	5.6	2.4	2.6	2.0	—	1.1	—	2.5	—	—
Yellow birch	24.6	4.6	8.9	3.4	2.8	1.5	1.3	.8	1.3	—	—
Paper birch	82.5	23.9	24.7	18.3	9.0	5.0	.8	.8	—	—	—
Sugar maple	23.6	7.3	1.4	2.3	2.6	2.6	3.6	.9	1.8	1.1	—
Soft maples	212.1	41.8	50.8	48.9	31.3	22.6	11.5	5.2	—	—	—
Beech	14.3	4.8	4.6	2.0	.8	1.4	.7	—	—	—	—
White ash[3]	23.9	3.2	—	5.0	3.5	3.1	6.9	—	—	2.2	—
Aspen	59.3	9.2	20.5	15.9	9.7	3.0	1.0	—	—	—	—
Other hardwoods	.6	—	.6	—	—	—	—	—	—	—	—
Total hardwoods	457.1	100.4	113.9	98.4	61.7	39.2	26.9	7.7	5.6	3.3	—
All species	1,648.9	505.9	448.0	285.4	186.0	103.2	59.7	29.9	18.4	11.8	.6

[1]Includes 11.2 million cubic feet of red pine.
[2]Includes 36.2 million cubic feet of black spruce.
[3]Includes 11.6 million cubic feet of black ash.

Table 66.—*Growing-stock volume in the WESTERN MAINE UNIT, by species and diameter classes, 1971*

[In millions of cubic feet]

Species	Total	Diameter class (inches at breast height)									
		5.0-6.9	7.0-8.9	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	220.3	22.0	31.2	28.6	41.6	27.1	27.7	9.2	10.6	18.7	3.6
White spruce[2]	71.5	21.8	17.3	13.2	13.1	1.1	2.3	—	1.3	1.4	—
Red spruce	356.8	112.2	101.6	65.2	30.3	23.6	10.0	10.0	1.2	2.7	—
Balsam fir	520.1	193.2	176.0	103.6	30.3	11.1	4.7	1.2	—	—	—
Hemlock	111.9	23.4	18.5	19.2	20.5	14.8	11.2	2.1	.7	1.5	—
No. white-cedar	33.8	6.1	12.8	8.1	4.4	—	.8	.8	.8	—	—
Other softwoods	6.4	—	.7	—	—	3.2	1.2	—	1.3	—	—
Total softwoods	1,320.8	378.7	358.1	237.9	140.2	80.9	57.9	23.3	15.9	24.3	3.6
Red oaks[3]	66.9	5.0	11.5	13.2	7.3	10.6	2.2	6.4	5.3	5.4	—
Yellow birch	187.4	32.7	20.6	28.8	34.7	27.5	13.6	13.0	4.5	10.3	1.7
Paper birch	167.9	46.0	40.6	45.0	12.9	13.1	4.3	4.1	1.0	.9	—
Sugar maple	179.4	31.2	23.2	27.2	23.9	24.4	13.8	17.3	8.0	10.4	—
Soft maples	224.1	48.3	62.5	40.2	30.1	17.0	10.9	5.8	3.9	5.4	—
Beech	108.5	33.1	24.1	21.4	14.2	6.2	7.1	1.0	.5	.9	—
White ash[4]	29.2	1.5	9.4	4.8	2.3	6.4	2.5	1.2	1.1	—	—
Aspen	119.8	15.7	42.4	25.2	19.0	7.3	4.5	5.7	—	—	—
Other hardwoods[5]	13.0	2.0	1.3	—	3.8	1.9	1.2	—	1.5	1.3	—
Total hardwoods	1,096.2	215.5	235.6	205.8	148.2	114.4	60.1	54.5	25.8	34.6	1.7
All species	2,417.0	594.2	593.7	443.7	288.4	195.3	118.0	77.8	41.7	58.9	5.3

[1]Includes 7.1 million cubic feet of red pine.
[2]Includes 0.5 million cubic feet of black spruce.
[3]Includes 3.3 million cubic feet of white oaks.
[4]Includes 2.1 million cubic feet of black ash.
[5]Includes 7.1 million cubic feet of basswood, 3.7 of black cherry, and 2.2 of elm.
Note: For county breakdowns of species in this unit, see table 103.

Table 67.—*Sawtimber volume in the AROOSTOOK COUNTY UNIT, by species and diameter classes, 1971*

[In millions of board feet, International ¼-inch rule]

Species	Total	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine	188.8	7.0	12.4	27.9	16.2	37.8	19.4	61.7	6.4
White spruce[1]	487.8	213.4	121.2	56.9	48.2	39.6	4.2	4.3	—
Red spruce	2,627.0	760.8	669.2	524.9	331.0	186.9	90.0	64.2	—
Balsam fir	2,043.1	1,187.3	560.3	210.3	61.2	17.5	6.5	—	—
Hemlock	239.4	41.2	45.5	44.6	17.9	31.6	19.2	39.4	—
No. white-cedar	708.8	270.5	207.4	105.6	82.5	30.9	2.3	9.6	—
Other softwoods	89.7	26.8	41.8	15.4	5.7	—	—	—	—
Total softwoods	6,384.6	2,507.0	1,657.8	985.6	562.7	344.3	141.6	179.2	6.4
Yellow birch	257.0	—	70.0	66.2	44.0	25.3	30.3	21.2	—
Paper birch	79.0	—	36.0	20.5	9.0	6.3	—	7.2	—
Sugar maple	856.0	—	110.7	158.4	204.2	86.2	118.7	174.4	3.4
Soft maples	396.7	—	116.3	120.6	97.7	24.7	21.9	15.5	—
Beech	373.4	—	154.5	114.5	51.4	47.1	3.2	2.7	—
White ash[2]	118.3	—	53.9	27.9	28.1	3.8	4.6	—	—
Aspen	322.9	—	153.7	95.2	45.0	25.9	3.1	—	—
Other hardwoods[3]	72.7	—	29.9	20.4	10.8	7.2	4.4	—	—
Total hardwoods	2,476.0	—	725.0	623.7	490.2	226.5	186.2	221.0	3.4
All species	8,860.6	2,507.0	2,382.8	1,609.3	1,052.9	570.8	327.8	400.2	9.8

[1]Includes 24.4 million board feet of black spruce.
[2]Includes 67.6 million board feet of black ash.
[3]Includes 55.6 million board feet of balsam poplar, 6.6 of basswood, and 10.5 of elm.

Table 68.—*Sawtimber volume in the CAPITAL REGION UNIT, by species and diameter classes, 1971*

[In millions of board feet, International ¼-inch rule]

Species	Total	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	597.0	103.2	90.2	110.6	87.3	33.1	71.1	76.7	24.8
White spruce[2]	66.0	20.0	14.8	10.8	6.3	—	7.1	7.0	—
Red spruce	130.1	49.2	48.4	27.2	5.3	—	—	—	—
Balsam fir	78.2	62.2	16.0	—	—	—	—	—	—
Hemlock	286.3	70.8	89.1	53.0	58.0	6.4	4.1	—	4.9
No. white-cedar	54.4	26.4	24.2	3.8	—	—	—	—	—
Other softwoods	23.8	7.8	4.5	11.5	—	—	—	—	—
Total softwoods	1,235.8	339.6	287.2	216.9	156.9	39.5	82.3	83.7	29.7
Red oaks	118.8	—	45.1	41.8	13.1	4.6	9.1	—	5.1
Yellow birch	60.2	—	15.2	15.3	18.1	4.1	—	7.5	—
Paper birch	48.4	—	25.0	15.3	4.1	—	4.0	—	—
Sugar maple	50.6	—	15.8	9.3	10.1	15.4	—	—	—
Soft maples	147.1	—	54.5	44.6	13.5	14.9	9.5	—	10.1
Beech	11.1	—	2.9	8.2	—	—	—	—	—
White ash[3]	31.6	—	17.2	9.9	4.5	—	—	—	—
Aspen	22.6	—	17.7	4.9	—	—	—	—	—
Other hardwoods[4]	161.4	—	41.5	14.6	22.8	22.7	25.1	20.6	14.1
Total hardwoods	651.8	—	234.9	163.9	86.2	61.7	47.7	28.1	29.3
All species	1,887.6	339.6	522.1	380.8	243.1	101.2	130.0	111.8	59.0

[1]Includes 9.1 million board feet of red pine.
[2]Includes 15.6 million board feet of black spruce.
[3]Includes 8.5 million board feet of black ash.
[4]Includes 131.7 million board feet of elm.
Note: For county breakdowns of species in this unit, see table 105.

Table 69.—*Sawtimber volume in the CASCO BAY UNIT, by species and diameter classes, 1971*

[In millions of board feet, International ¼-inch rule]

Species	Total	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	1,705.0	271.7	396.7	334.3	267.3	181.8	77.8	139.5	35.9
Red spruce	93.9	58.5	13.0	9.9	5.9	—	6.6	—	—
Balsam fir	21.7	12.1	9.6	—	—	—	—	—	—
Hemlock	494.8	137.2	90.4	109.8	89.9	45.7	11.3	10.5	—
Other softwoods	—	—	—	—	—	—	—	—	—
Total softwoods	2,315.4	479.5	509.7	454.0	363.1	227.5	95.7	150.0	35.9
Red oaks[2]	313.7	—	104.5	76.2	58.8	36.4	13.3	20.9	3.6
Yellow birch[3]	29.0	—	13.5	11.5	—	4.0	—	—	—
Paper birch	36.5	—	21.1	7.4	3.7	—	—	—	4.3
Sugar maple	25.8	—	—	—	—	10.2	—	15.6	—
Soft maples	104.8	—	45.8	31.7	16.8	4.2	—	—	6.3
Beech	27.5	—	3.7	8.1	12.3	—	—	3.4	—
White ash	14.3	—	3.7	—	—	—	4.5	—	6.1
Aspen	4.2	—	4.2	—	—	—	—	—	—
Other hardwoods	12.9	—	4.9	—	8.0	—	—	—	—
Total hardwoods	568.7	—	201.4	134.9	99.6	54.8	17.8	39.9	20.3
All species	2,884.1	479.5	711.1	588.9	462.7	282.3	113.5	189.9	56.2

[1]Includes 6.7 million board feet of red pine.
[2]Includes 13.5 million board feet of white oaks.
[3]Includes 3.6 million board feet of sweet birch.
Note: For county breakdowns of species in this unit, see table 105.

Table 70.—*Sawtimber volume in the HANCOCK COUNTY UNIT, by species and diameter classes, 1971*

[In millions of board feet, International ¼-inch rule]

Species	Total	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	105.5	22.9	—	17.8	28.7	3.7	12.2	12.5	7.7
White spruce[2]	61.7	28.4	24.0	3.8	5.5	—	—	—	—
Red spruce	596.7	233.8	144.5	97.2	64.7	34.7	12.3	9.5	—
Balsam fir	43.5	34.0	9.5	—	—	—	—	—	—
Hemlock	201.4	24.8	62.6	58.4	48.0	4.8	—	2.8	—
No. white-cedar	136.9	74.4	39.1	23.4	—	—	—	—	—
Other softwoods	20.0	6.2	8.9	4.9	—	—	—	—	—
Total softwoods	1,165.7	424.5	288.6	205.5	146.9	43.2	24.5	24.8	7.7
Red oaks	9.2	—	3.7	5.5	—	—	—	—	—
Yellow birch	27.2	—	12.2	3.8	3.4	3.5	4.3	—	—
Paper birch	18.6	—	15.6	3.0	—	—	—	—	—
Sugar maple	16.5	—	9.6	—	—	—	—	2.3	4.6
Soft maples	102.7	—	35.8	24.4	25.7	7.0	6.6	3.2	—
Beech	18.5	—	6.4	2.5	6.5	3.1	—	—	—
White ash	27.0	—	7.7	6.2	7.5	—	—	5.6	—
Aspen	9.1	—	9.1	—	—	—	—	—	—
Other hardwoods	4.2	—	—	—	4.2	—	—	—	—
Total hardwoods	233.0	—	100.1	45.4	47.3	13.6	10.9	11.1	4.6
All species	1,398.7	424.5	388.7	250.9	194.2	56.8	35.4	35.9	12.3

[1]Includes 3.7 million board feet of red pine.
[2]Includes 4.0 million board feet of black spruce.

Table 71.—*Sawtimber volume in the PENOBSCOT COUNTY UNIT, by species and diameter classes, 1971*

[In millions of board feet, International ¼-inch rule]

Species	Total	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	359.5	28.0	28.7	61.9	72.0	57.4	29.7	53.4	28.4
White spruce[2]	67.4	35.5	20.6	3.8	7.5	—	—	—	—
Red spruce	779.2	323.6	208.2	150.7	67.2	20.5	9.0	—	—
Balsam fir	287.4	164.1	98.4	19.0	2.9	3.0	—	—	—
Hemlock	585.9	129.4	138.8	117.6	79.5	43.9	32.6	44.1	—
No. white-cedar	214.7	109.7	72.7	23.5	6.8	2.0	—	—	—
Other softwoods	11.7	4.8	3.2	—	3.7	—	—	—	—
Total softwoods	2,305.8	795.1	570.6	376.5	239.6	126.8	71.3	97.5	28.4
Red oaks	28.8	—	—	—	6.0	4.5	—	18.3	—
Yellow birch	100.0	—	43.0	16.6	19.9	14.7	—	5.8	—
Paper birch	52.2	—	11.5	17.3	15.3	2.5	2.7	2.9	—
Sugar maple	239.7	—	26.3	31.8	27.9	50.9	40.0	54.6	8.2
Soft maples	373.7	—	128.0	82.8	90.8	35.8	23.0	13.3	—
Beech	82.2	—	29.5	31.2	14.7	3.7	3.1	—	—
White ash[3]	81.2	—	18.9	20.8	26.3	11.3	—	3.9	—
Aspen	35.4	—	15.1	17.0	3.3	—	—	—	—
Other hardwoods[4]	73.1	—	27.7	15.5	—	2.8	3.0	18.0	6.1
Total hardwoods	1,066.3	—	300.0	233.0	204.2	126.2	71.8	116.8	14.3
All species	3,372.1	795.1	870.6	609.5	443.8	253.0	143.1	214.3	42.7

[1]Includes 5.3 million board feet of red pine.
[2]Includes 12.9 million board feet of black spruce.
[3]Includes 51.3 million board feet of black ash.
[4]Includes 28.1 million board feet of basswood, 39.0 of elm, and 6.0 of other hardwood species.

Table 72.—*Sawtimber volume in the PISCATAQUIS COUNTY UNIT, by species and diameter classes, 1971*

[In millions of board feet, International ¼-inch rule]

Species	Diameter class (inches at breast height)								
	Total	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	597.4	44.9	63.0	46.7	45.5	33.8	65.7	249.2	48.6
White spruce[2]	190.2	57.3	53.9	26.7	20.5	9.4	5.1	17.3	—
Red spruce	1,564.6	524.1	414.1	257.2	183.7	117.9	51.0	16.6	—
Balsam fir	671.1	466.3	164.2	37.0	3.6	—	—	—	—
Hemlock	188.0	31.7	41.4	21.6	17.1	29.8	12.2	34.2	—
No. white-cedar	544.3	154.4	149.3	89.3	57.5	37.2	7.3	36.8	12.5
Other softwoods	3.4	—	3.4	—	—	—	—	—	—
Total softwoods	3,759.0	1,278.7	889.3	478.5	327.9	228.1	141.3	354.1	61.1
Red oaks	54.7	—	—	5.6	—	14.5	24.4	10.2	—
Yellow birch	338.1	—	94.2	70.2	25.6	52.9	43.3	51.9	—
Paper birch	102.4	—	44.5	22.8	11.2	15.8	8.1	—	—
Sugar maple	873.6	—	107.4	166.5	131.5	169.8	111.7	181.9	4.8
Soft maples	250.8	—	64.7	84.1	38.0	31.9	5.0	27.1	—
Beech	216.1	—	53.1	57.1	42.5	14.8	22.9	25.7	—
White ash[3]	81.1	—	35.8	8.4	27.5	9.4	—	—	—
Aspen	36.4	—	18.5	8.4	—	9.5	—	—	—
Other hardwoods[4]	113.3	—	21.3	19.6	12.3	10.6	30.9	18.6	—
Total hardwoods	2,066.5	—	439.5	442.7	288.6	329.2	246.3	315.4	4.8
All species	5,825.5	1,278.7	1,328.8	921.2	616.5	557.3	387.6	669.5	65.9

[1]Includes 8.4 million board feet of red pine.
[2]Includes 30.7 million board feet of black spruce.
[3]Includes 27.5 million board feet of black ash.
[4]Includes 44.0 million board feet of basswood, 3.1 of black walnut, and 66.2 of elm.

Table 73.—*Sawtimber volume in the SOMERSET COUNTY UNIT, by species and diameter classes, 1971*

[In millions of board feet, International ¼-inch rule]

Species	Total	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	142.5	22.1	19.9	23.8	10.1	—	13.6	39.7	13.3
White spruce[2]	237.2	73.4	81.5	38.3	22.8	9.5	11.7	—	—
Red spruce	931.5	427.7	262.8	129.5	61.8	32.8	12.5	4.4	—
Balsam fir	776.3	512.0	211.7	45.5	3.9	3.2	—	—	—
Hemlock	172.1	55.6	29.2	35.1	19.3	18.9	8.2	5.8	—
No. white-cedar	291.0	81.8	67.1	60.0	33.8	28.1	12.0	8.2	—
Other softwoods	11.4	7.0	4.4	—	—	—	—	—	—
Total softwoods	2,562.0	1,179.6	676.6	332.2	151.7	92.5	58.0	58.1	13.3
Yellow birch	371.2	—	76.2	80.6	79.4	43.8	38.7	52.5	—
Paper birch	114.5	—	41.1	39.8	8.5	18.4	3.7	3.0	—
Sugar maple	746.4	—	174.4	131.6	136.2	92.9	84.5	126.8	—
Soft maples	210.4	—	58.5	62.5	50.3	22.2	11.2	5.7	—
Beech	141.3	—	43.0	34.0	44.7	8.6	9.9	1.1	—
White ash[3]	25.0	—	16.5	8.5	—	—	—	—	—
Aspen	73.0	—	36.4	24.7	11.9	—	—	—	—
Other hardwoods[4]	102.9	—	27.1	13.0	15.0	9.8	35.3	2.7	—
Total hardwoods	1,784.7	—	473.2	394.7	346.0	195.7	183.3	191.8	—
All species	4,346.7	1,179.6	1,149.8	726.9	497.7	288.2	241.3	249.9	13.3

[1]Includes 3.2 million board feet of red pine.
[2]Includes 5.9 million board feet of black spruce.
[3]Includes 10.8 million board feet of black ash.
[4]Includes 16.1 million board feet of elm, 70.7 of basswood, and 16.1 of other hardwood species.

Table 74.—*Sawtimber volume in the WASHINGTON COUNTY UNIT, by species and diameter classes, 1971*

[In millions of board feet, International ¼-inch rule]

Species	Total	Diameter class (inches at breast height)							
		9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	286.6	27.6	46.5	44.6	44.7	40.4	46.2	33.6	3.0
White spruce[2]	46.1	17.0	13.2	7.0	8.9	—	—	—	—
Red spruce	829.6	346.9	254.1	141.5	46.6	28.4	8.5	3.6	—
Balsam fir	119.3	78.0	32.9	8.4	—	—	—	—	—
Hemlock	262.6	84.9	76.6	25.8	40.9	28.2	3.0	3.2	—
No. white-cedar	146.0	76.5	45.7	12.4	2.3	5.5	3.6	—	—
Other softwoods	57.8	26.3	8.4	23.1	—	—	—	—	—
Total softwoods	1,748.0	657.2	477.4	262.8	143.4	102.5	61.3	40.4	3.0
Red oaks	23.4	—	6.5	—	4.4	—	12.5	—	—
Yellow birch	31.6	—	10.0	5.9	5.6	3.9	6.2	—	—
Paper birch	60.3	—	32.8	20.0	3.6	3.9	—	—	—
Sugar maple	53.7	—	9.1	10.0	15.0	4.1	9.0	6.5	—
Soft maples	271.0	—	109.3	88.0	49.2	24.5	—	—	—
Beech	11.2	—	2.9	5.4	2.9	—	—	—	—
White ash[3]	64.0	—	12.4	12.0	29.0	—	—	10.6	—
Aspen	51.7	—	35.5	12.1	4.1	—	—	—	—
Total hardwoods	566.9	—	218.5	153.4	113.8	36.4	27.7	17.1	—
All species	2,314.9	657.2	695.9	416.2	257.2	138.9	89.0	57.5	3.0

[1]Includes 44.7 million board feet of red pine.
[2]Includes 14.0 million board feet of black spruce.
[3]Includes 25.1 million board feet of black ash.

Table 75.—*Sawtimber volume in the WESTERN MAINE UNIT, by species and diameter classes, 1971*

[In millions of board feet, International ¼-inch rule]

Species	Diameter class (inches at breast height)								
	Total	9.0-10.9	11.0-12.9	13.0-14.9	15.0-16.9	17.0-18.9	19.0-20.9	21.0-28.9	29.0+
White pine[1]	586.0	85.8	133.3	94.2	101.6	35.0	42.0	79.0	15.1
White spruce	109.2	42.5	42.8	3.9	8.8	—	5.3	5.9	—
Red spruce	486.4	207.2	102.3	83.9	37.5	39.5	4.3	11.7	—
Balsam fir	492.8	329.3	102.3	38.7	17.7	4.8	—	—	—
Hemlock	235.9	59.5	67.1	52.9	41.8	7.9	1.4	5.3	—
No. white-cedar	48.6	26.0	14.2	—	2.6	2.8	3.0	—	—
Other softwoods	20.7	—	—	11.4	4.6	—	4.7	—	—
Total softwoods	1,979.6	750.3	462.0	285.0	214.6	90.0	60.7	101.9	15.1
Red oaks[2]	144.9	—	26.2	39.0	8.2	26.7	21.7	23.1	—
Yellow birch	393.8	—	117.0	98.2	54.7	52.3	19.4	44.8	7.4
Paper birch	135.0	—	43.1	48.6	16.9	17.8	4.2	4.4	—
Sugar maple	372.3	—	79.3	86.7	55.7	71.6	33.7	45.3	—
Soft maples	266.4	—	99.1	61.2	42.9	23.1	17.1	23.0	—
Beech	117.5	—	49.2	23.4	31.6	5.2	2.6	5.5	—
White ash[3]	49.1	—	8.2	22.5	9.2	4.6	4.6	—	—
Aspen	135.3	—	65.5	27.3	18.6	23.9	—	—	—
Other hardwoods[4]	35.6	—	12.4	7.5	4.5	—	6.0	5.2	—
Total hardwoods	1,649.9	—	500.0	414.4	242.3	225.2	109.3	151.3	7.4
All species	3,629.5	750.3	962.0	699.4	456.9	315.2	170.0	253.2	22.5

[1]Includes 23.3 million board feet of red pine .
[2]Includes 3.2 million board feet of white oaks.
[3]Includes 7.4 million board feet of black ash.
[4]Includes 23.3 million board feet of basswood, 7.6 of black cherry, and 4.7 of elm.
Note: For county breakdowns of species in this unit, see table 105.

Table 76.—*Volume of sawtimber in the AROOSTOOK COUNTY UNIT, by species and log-quality classes, 1971*

[In millions of board feet][1]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[2]
White pine	188.8	29.2	40.2	78.6	40.8
Other softwoods[3]	6,195.8	—	—	—	—
Total softwoods	6,384.6	29.2	40.2	78.6	40.8
Yellow birch	257.0	21.4	67.0	146.3	22.3
Paper birch	79.0	7.5	17.0	47.9	6.6
Sugar maple	856.0	115.7	218.2	411.5	110.6
Soft maples	396.7	43.4	104.1	185.4	63.8
Beech	373.4	2.6	40.0	284.1	46.7
White ash	118.3	20.8	30.8	41.4	25.3
Aspen	322.9	8.5	59.1	184.4	70.9
Other hardwoods	72.7	13.0	7.8	34.1	17.8
Total hardwoods	2,476.0	232.9	544.0	1,335.1	364.0

[1]International ¼-inch rule.
[2]Grade 4 applies only to the pines. For hardwoods the volumes in this column are for construction logs.
[3]Species other than pines were not graded into standard-lumber logs.

Table 77.—*Volume of sawtimber in the CAPITOL REGION UNIT, by species and log-quality classes, 1971*

[In millions of board feet][1]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[2]
White pine[3]	597.0	1.9	36.9	250.1	308.1
Other softwoods[4]	638.8	—	—	—	—
Total softwoods	1,235.8	1.9	36.9	250.1	308.1
Red oaks	118.8	.6	39.3	68.2	10.7
Yellow birch	60.2	6.7	14.2	28.2	11.1
Paper birch	48.4	.6	12.0	33.1	2.7
Sugar maple	50.6	8.9	12.1	21.6	8.0
Soft maples	147.1	7.5	29.2	91.6	18.8
Beech	11.1	.1	—	10.1	.9
White ash	31.6	—	12.5	14.2	4.9
Aspen	22.6	—	3.3	11.3	8.0
Other hardwoods	161.4	17.6	51.1	80.6	12.1
Total hardwoods	651.8	42.0	173.7	358.9	77.2

[1]International ¼-inch rule.
[2]Grade 4 applies only to the pines. For hardwoods the volumes in this column are for construction logs.
[3]Includes a small volume of red pine.
[4]Species other than pines were not graded into standard-lumber logs.

Table 78.—*Volume of sawtimber in the CASCO BAY UNIT, by species and log-quality classes, 1971*

[In millions of board feet][1]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[2]
White pine[3]	1,705.0	13.4	50.1	890.7	750.8
Other softwoods[4]	610.4	—	—	—	—
Total softwoods	2,315.4	13.4	50.1	890.7	750.8
Red oaks	313.7	38.3	56.1	185.6	33.7
Yellow birch	29.0	3.2	1.2	19.0	5.6
Paper birch	36.5	.6	.8	29.3	5.8
Sugar maple	25.8	12.4	5.9	5.4	2.1
Soft maples	104.8	3.1	10.1	71.7	19.9
Beech	27.5	.2	—	17.7	9.6
White ash	14.3	2.8	5.2	2.2	4.1
Aspen	4.2	—	—	3.4	.8
Other hardwoods	12.9	—	5.3	6.6	1.0
Total hardwoods	568.7	60.6	84.6	340.9	82.6

[1]International ¼-inch rule.
[2]Grade 4 applies only to the pines. For hardwoods the volumes in this column are for construction logs.
[3]Includes a small volume of red pine.
[4]Species other than pines were not graded into standard-lumber logs.

Table 79.—*Volume of sawtimber in the HANCOCK COUNTY UNIT, by species and log-quality classes, 1971*

[In millions of board feet][1]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[2]
White pine[3]	105.5	12.1	16.6	47.9	28.9
Other softwoods[4]	1,060.2	—	—	—	—
Total softwoods	1,165.7	12.1	16.6	47.9	28.9
Red oaks	9.2	3.9	.6	4.3	.4
Yellow birch	27.2	2.4	11.5	9.2	4.1
Paper birch	18.6	.3	2.6	12.3	3.4
Sugar maple	16.5	2.4	.7	11.3	2.1
Soft maples	102.7	7.6	14.9	64.2	16.0
Beech	18.5	2.4	.8	13.7	1.6
White ash	27.0	2.1	5.2	15.5	4.2
Aspen	9.1	—	—	7.4	1.7
Other hardwoods	4.2	2.1	1.0	.9	.2
Total hardwoods	233.0	23.2	37.3	138.8	33.7

[1]International ¼-inch rule.
[2]Grade 4 applies only to the pines. For hardwoods the volumes in this column are for construction logs.
[3]Includes a small volume of red pine.
[4]Species other than pines were not graded into standard-lumber logs.

Table 80.—*Volume of sawtimber in the PENCOBSCOT COUNTY UNIT, by species and log-quality classes, 1971*

[In millions of board feet][1]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[2]
White pine[3]	359.5	21.1	42.2	177.2	119.0
Other softwoods[4]	1,946.3	—	—	—	—
Total softwoods	2,305.8	21.1	42.2	177.2	119.0
Red oaks	28.8	10.2	9.4	5.6	3.6
Yellow birch	100.0	12.8	22.7	56.8	7.7
Paper birch	52.2	4.3	21.0	24.3	2.6
Sugar maple	239.7	55.7	62.0	97.7	24.3
Soft maples	373.7	25.6	83.5	206.6	58.0
Beech	82.2	.7	1.7	66.1	13.7
White ash	81.2	18.7	18.4	34.5	9.6
Aspen	35.4	—	7.5	16.8	11.1
Other hardwoods	73.1	17.3	14.6	36.1	5.1
Total hardwoods	1,066.3	145.3	240.8	544.5	135.7

[1]International ¼-inch rule.
[2]Grade 4 applies only to the pines. For hardwoods the volumes in this column are for construction logs.
[3]Includes 5.3 million board feet of red pine.
[4]Species other than pines were not graded into standard-lumber logs.

Table 81.—*Volume of sawtimber in the PISCATAQUIS COUNTY UNIT, by species and log-quality classes, 1971*

[In millions of board feet][1]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[2]
White pine[3]	597.4	48.2	106.0	270.5	172.7
Other softwoods[4]	3,161.6	—	—	—	—
Total softwoods	3,759.0	48.2	106.0	270.5	172.7
Red oaks	54.7	14.1	20.0	16.9	3.7
Yellow birch	338.1	72.3	94.0	154.9	16.9
Paper birch	102.4	12.7	26.5	55.1	8.1
Sugar maple	873.6	196.6	240.0	350.3	86.7
Soft maples	250.8	15.0	55.9	139.0	40.9
Beech	216.1	10.4	8.4	157.7	39.6
White ash	81.1	10.9	23.2	36.1	10.9
Aspen	36.4	2.5	6.2	21.9	5.8
Other hardwoods	113.3	25.0	34.7	45.9	7.7
Total hardwoods	2,066.5	359.5	508.9	977.8	220.3

[1]International ¼-inch rule.
[2]Grade 4 applies only to the pines. For hardwoods the volumes in this column are for construction logs.
[3]Includes a small volume of red pine.
[4]Species other than pines were not graded into standard-lumber logs.

Table 82.—*Volume of sawtimber in the SOMERSET COUNTY UNIT, by species and log-quality classes, 1971*

[In millions of board feet][1]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[2]
White pine[3]	142.5	4.4	22.9	71.5	43.7
Other softwoods[4]	2,419.5	—	—	—	—
Total softwoods	2,562.0	4.4	22.9	71.5	43.7
Yellow birch	371.2	19.6	117.4	186.7	47.5
Paper birch	114.5	1.2	33.1	68.2	12.0
Sugar maple	746.4	83.4	178.4	394.6	90.0
Soft maples	210.4	12.1	34.0	137.3	27.0
Beech	141.3	.6	22.7	74.3	43.7
White ash	25.0	—	5.4	15.3	4.3
Aspen	73.0	2.9	9.1	48.6	12.4
Other hardwoods	102.9	16.2	31.0	48.1	7.6
Total hardwoods	1,784.7	136.0	431.1	973.1	244.5

[1]International ¼-inch rule.
[2]Grade 4 applies only to the pines. For hardwoods the volumes in this column are for construction logs.
[3]Includes a small volume of red pine.
[4]Species other than pines were not graded into standard-lumber logs.

Table 83.—*Volume of sawtimber in the WASHINGTON COUNTY UNIT, by species and log-quality classes, 1971*

[In millions of board feet][1]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[2]
White pine[3]	286.6	15.0	36.1	153.4	82.1
Other softwoods[4]	1,461.4	—	—	—	—
Total softwoods	1,748.0	15.0	36.1	153.4	82.1
Red oaks	23.4	3.3	2.9	15.5	1.7
Yellow birch	31.6	5.0	3.5	21.4	1.7
Paper birch	60.3	3.6	5.9	46.9	3.9
Sugar maple	53.7	11.8	13.0	23.8	5.1
Soft maples	271.0	21.7	47.0	168.0	34.3
Beech	11.2	.1	—	10.2	.9
White ash	64.0	17.0	19.5	20.9	6.6
Aspen	51.7	—	6.0	36.4	9.3
Total hardwoods	566.9	62.5	97.8	343.1	63.5

[1]International ¼-inch rule.
[2]Grade 4 applies only to the pines. For hardwoods the volumes in this column are for construction logs.
[3]Includes a small volume of red pine.
[4]Species other than pines were not graded into standard-lumber logs.

Table 84.—*Volume of sawtimber in the WESTERN MAINE UNIT, by species and log-quality classes, 1971*

[In millions of board feet][1]

Species	All classes	Standard-lumber logs			
		Grade 1	Grade 2	Grade 3	Grade 4[2]
White pine[3]	586.0	17.2	55.9	336.4	176.5
Other softwoods[4]	1,393.6	—	—	—	—
Total softwoods	1,979.6	17.2	55.9	336.4	176.5
Red oaks	144.9	52.4	32.7	48.4	11.4
Yellow birch	393.8	61.9	87.2	225.5	19.2
Paper birch	135.0	19.7	26.6	80.7	8.0
Sugar maple	372.3	78.9	86.5	171.3	35.6
Soft maples	266.4	16.4	51.8	158.6	39.6
Beech	117.5	1.1	3.8	71.9	40.7
White ash	49.1	17.3	8.3	18.8	4.7
Aspen	135.3	19.7	21.6	60.9	33.1
Other hardwoods	35.6	7.9	6.1	18.3	3.3
Total hardwoods	1,649.9	275.3	324.6	854.4	195.6

[1]International ¼-inch rule.
[2]Grade 4 applies only to the pines. For hardwoods the volumes in this column are for construction logs.
[3]Includes a small volume of red pine.
[4]Species other than pines were not graded into standard-lumber logs.

Table 85.—*Average annual net growth and removals of growing stock and sawtimber on commercial forest land, by species, in the AROOSTOOK COUNTY UNIT, 1958-70*

Species	Growing stock		Sawtimber	
	Annual net growth	Annual timber removals	Annual net growth	Annual timber removals
	Thousand cubic feet		*Thousand board feet*[1]	
Softwoods:				
White pine	857	757	4,165	3,856
Spruce	50,405	23,333	100,441	42,173
Balsam fir	63,360	18,682	74,581	24,505
Hemlock	3,657	1,907	4,641	2,733
No. white-cedar	3,019	6,152	11,546	14,463
Other softwoods	900	892	2,100	350
Total softwoods	122,198	51,723	197,474	88,080
Hardwoods:				
Red oaks	—	—	—	—
Yellow birch	363	671	-2,396	929
Paper birch	2,413	1,063	2,280	2,347
Sugar maple	6,557	3,807	7,738	4,063
Soft maples	4,626	892	13,621	6,160
Beech	3,614	989	5,973	2,332
Ash	937	812	3,225	3,008
Aspen	7,591	181	12,215	990
Other hardwoods	957	132	2,150	858
Total hardwoods	27,058	8,547	44,806	20,687
Total, all species	149,256	60,270	242,280	108,767

[1]International ¼-inch rule.

Table 86.—*Average annual net growth and removals of growing stock and sawtimber on commercial forest land, by species, in the CAPITOL REGION UNIT, 1958-70*

Species	Growing stock		Sawtimber	
	Annual net growth	Annual timber removals	Annual net growth	Annual timber removals
	Thousand cubic feet		*Thousand board feet*[1]	
Softwoods:				
White pine	11,386	12,211	31,009	30,523
Spruce	5,037	3,360	6,388	3,196
Balsam fir	5,157	3,864	2,412	1,562
Hemlock	6,035	6,977	15,902	17,110
No. white-cedar	622	330	1,201	851
Other softwoods	298	90	826	218
Total softwoods	28,535	26,832	57,738	53,460
Hardwoods:				
Red oaks	1,229	2,996	3,476	5,545
Yellow birch	400	100	255	421
Paper birch	1,025	692	1,502	1,318
Sugar maple	703	120	601	301
Soft maples	3,509	348	4,666	1,730
Beech	294	127	262	120
Ash	351	967	1,088	1,496
Aspen	1,085	102	842	259
Other hardwoods	1,262	2,262	2,712	3,128
Total hardwoods	9,858	7,714	15,404	14,318
Total, all species	38,393	34,546	73,142	67,778

[1]International ¼-inch rule.

Table 87.—*Average annual net growth and removals of growing stock and sawtimber on commercial forest land, by species, in the CASCO BAY UNIT, 1958-70*

Species	Growing stock		Sawtimber	
	Annual net growth	Annual timber removals	Annual net growth	Annual timber removals
	Thousand cubic feet		*Thousand board feet*[1]	
Softwoods:				
White pine	25,760	11,375	72,177	30,678
Spruce	1,488	1,638	1,564	1,697
Balsam fir	879	346	589	97
Hemlock	10,947	5,338	17,052	6,527
No. white-cedar	—	—	—	—
Other softwoods	112	12	—	—
Total softwoods	39,186	18,709	91,382	38,999
Hardwoods:				
Red oaks	4,709	2,884	8,146	4,295
Yellow birch	925	558	618	326
Paper birch	1,139	789	1,188	962
Sugar maple	330	138	466	374
Soft maples	4,980	2,464	4,529	2,913
Beech	475	975	410	693
Ash	347	172	421	179
Aspen	857	65	165	49
Other hardwoods	-530	53	75	325
Total hardwoods	13,232	8,098	16,018	10,116
Total, all species	52,418	26,807	107,400	49,115

[1]International ¼-inch rule.

Table 88—*Average annual net growth and removals of growing stock and sawtimber on commercial forest land, by species, in the HANCOCK COUNTY UNIT, 1958-70*

Species	Growing stock		Sawtimber	
	Annual net growth	Annual timber removals	Annual net growth	Annual timber removals
	Thousand cubic feet		*Thousand board feet*[1]	
Softwoods:				
White pine	1,665	1,715	4,907	5,732
Spruce	8,604	8,204	22,590	20,065
Balsam fir	3,429	628	1,833	933
Hemlock	2,418	918	10,181	5,656
No. white-cedar	2,706	46	4,585	252
Other softwoods	263	30	684	126
Total softwoods	19,085	11,541	44,780	32,764
Hardwoods:				
Red oaks	208	200	188	380
Yellow birch	227	19	462	112
Paper birch	804	479	531	2,131
Sugar maple	168	51	255	180
Soft maples	1,710	109	3,333	650
Beech	295	95	354	129
Ash	290	57	782	348
Aspen	455	30	342	92
Other hardwoods	31	23	75	50
Total hardwoods	4,188	1,063	6,322	4,072
Total, all species	23,273	12,604	51,102	36,836

[1]International ¼-inch rule.

Table 89.—*Average annual net growth and removals of growing stock and sawtimber on commercial forest land, by species, in the PENOBSCOT COUNTY UNIT, 1958-70*

Species	Growing stock		Sawtimber	
	Annual net growth	Annual timber removals	Annual net growth	Annual timber removals
	Thousand cubic feet		*Thousand board feet*[1]	
Softwoods:				
White pine	4,095	5,270	9,850	12,533
Spruce	17,594	4,011	24,904	3,290
Balsam fir	12,387	1,220	9,229	2,678
Hemlock	9,475	2,350	16,659	4,503
No. white-cedar	400	400	2,500	2,167
Other softwoods	722	2,489	1,821	46
Total softwoods	44,673	15,740	64,963	25,217
Hardwoods:				
Red oaks	250	250	300	300
Yellow birch	996	1,029	1,478	3,562
Paper birch	2,312	1,645	1,830	1,314
Sugar maple	3,795	2,161	7,427	4,552
Soft maples	4,089	4,239	13,620	13,962
Beech	557	1,540	–2,803	397
Ash	649	1,149	2,917	3,584
Aspen	2,217	508	1,418	360
Other hardwoods	1,071	288	1,823	65
Total hardwoods	15,936	12,809	28,010	28,096
Total, all species	60,609	28,549	92,973	53,313

[1]International ¼-inch rule.

Table 90.—*Average annual net growth and removals of growing stock and sawtimber on commercial forest land, by species, in the PISCATAQUIS COUNTY UNIT, 1958-70*

Species	Growing stock		Sawtimber	
	Annual net growth	Annual timber removals	Annual net growth	Annual timber removals
	Thousand cubic feet		*Thousand board feet*[1]	
Softwoods:				
White pine	3,834	559	11,883	833
Spruce	38,681	6,071	66,776	14,702
Balsam fir	28,230	5,045	29,003	8,403
Hemlock	1,249	1,382	–334	399
No. white-cedar	5,300	5,300	2,000	1,167
Other softwoods	155	280	110	18
Total softwoods	77,449	18,637	109,438	25,522
Hardwoods:				
Red oaks	401	1,201	2,438	5,371
Yellow birch	–222	1,364	–4,446	363
Paper birch	3,122	2,414	6,078	3,728
Sugar maple	3,635	3,418	967	401
Soft maples	3,467	2,600	9,261	2,279
Beech	1,685	843	–2,804	321
Ash	1,650	1,550	3,736	1,903
Aspen	1,817	569	1,647	547
Other hardwoods	577	735	2,950	3,825
Total hardwoods	16,132	14,694	19,827	18,738
Total, all species	93,581	33,331	129,265	44,260

[1]International ¼-inch rule.

Table 91.—*Average annual net growth and removals of growing stock and sawtimber on commercial forest land, by species, in the SOMERSET COUNTY UNIT, 1958-70*

Species	Growing stock		Sawtimber	
	Annual net growth	Annual timber removals	Annual net growth	Annual timber removals
	Thousand cubic feet		*Thousand board feet*[1]	
Softwoods:				
White pine	2,691	1,791	6,545	3,720
Spruce	29,553	8,197	41,627	10,062
Balsam fir	33,523	10,025	33,068	12,718
Hemlock	3,496	1,496	8,662	4,712
No. white-cedar	–183	450	–2,873	444
Other softwoods	128	378	306	23
Total softwoods	69,208	22,337	87,335	31,679
Hardwoods:				
Red oaks	20	20	—	—
Yellow birch	1,854	4,112	9,740	11,373
Paper birch	3,078	1,436	2,584	951
Sugar maple	5,695	5,570	25,968	19,500
Soft maples	5,168	1,400	9,801	4,960
Beech	2,122	47	–752	282
Ash	977	394	486	177
Aspen	3,320	762	3,378	2,095
Other hardwoods	1,161	44	2,551	243
Total hardwoods	23,395	13,785	53,756	39,581
Total, all species	92,603	36,122	141,091	71,260

[1]International ¼-inch rule.

Table 92.—*Average annual net growth and removals of growing stock and sawtimber on commercial forest land, by species, in the WASHINGTON COUNTY UNIT, 1958-70*

Species	Growing stock		Sawtimber	
	Annual net growth	Annual timber removals	Annual net growth	Annual timber removals
	Thousand cubic feet		*Thousand board feet*[1]	
Softwoods:				
White pine	2,109	2,817	8,258	11,075
Spruce	20,623	9,083	40,462	24,727
Balsam fir	7,494	2,320	4,012	2,104
Hemlock	5,121	2,639	9,428	5,845
No. white-cedar	2,600	2,600	2,500	2,500
Other softwoods	1,108	141	1,711	270
Total softwoods	39,055	19,600	66,371	46,521
Hardwoods:				
Red oaks	193	193	505	1,122
Yellow birch	–1,820	530	–4,724	3,134
Paper birch	1,726	68	2,359	443
Sugar maple	309	251	1,670	1,628
Soft maples	2,594	21	9,056	140
Beech	100	350	351	2,151
Ash	252	477	1,202	2,193
Aspen	1,680	13	1,957	90
Other hardwoods	17	17	—	100
Total hardwoods	5,051	1,920	12,376	11,001
Total, all species	44;106	21,520	78,747	57,522

[1]International ¼-inch rule.

Table 93.—*Average annual net growth and removals of growing stock and sawtimber on commercial forest land, by species, in the WESTERN MAINE UNIT, 1958-70*

Species	Growing stock		Sawtimber	
	Annual net growth	Annual timber removals	Annual net growth	Annual timber removals
	Thousand cubic feet		*Thousand board feet*[1]	
Softwoods:				
White pine	13,875	20,175	39,702	55,391
Spruce	14,103	3,694	23,172	9,264
Balsam fir	22,584	8,125	24,545	18,770
Hemlock	3,988	1,280	10,788	5,696
No. white-cedar	700	700	900	1,750
Other softwoods	–239	19	–88	87
Total softwoods	55,011	33,993	99,019	90,958
Hardwoods:				
Red oaks	1,603	1,370	7,485	4,585
Yellow birch	3,720	3,462	10,589	6,273
Paper birch	3,688	2,621	5,833	3,091
Sugar maple	3,672	1,649	–1,490	660
Soft maples	6,756	2,573	11,408	11,718
Beech	2,399	874	4,951	868
Ash	1,199	674	2,176	668
Aspen	3,956	148	5,204	862
Other hardwoods	507	299	1,825	1,766
Total hardwoods	27,500	13,670	47,981	30,491
Total, all species	82,511	47,663	147,000	121,449

[1]International ¼-inch rule.

Table 94.—*Land area in Maine, by land classes, and selected counties, 1971*

Unit and county[1]	Total land area	Nonforest land area	Forest-land area			Sampling error
			Noncommercial[2]	Commercial		
	Thousand acres	*Thousand acres*	*Thousand acres*	*Thousand acres*	*Percent*	*Percent*
Capitol region:						
Kennebec	557.8	159.2	8.6	390.0	70	5
Knox	236.1	66.9	3.6	165.6	70	8
Lincoln	290.7	69.7	3.6	217.4	76	6
Waldo	471.8	106.1	6.5	359.2	76	5
Total	1,556.4	401.9	22.3	1,132.2	73	2
Casco Bay:						
Androscoggin	303.6	73.1	2.2	228.3	75	5
Cumberland	562.4	130.7	1.1	430.6	77	4
Sagadahoc	164.5	30.5	3.7	130.3	79	6
York	640.8	134.9	7.0	498.9	78	4
Total	1,671.3	369.2	14.0	1,288.1	77	2
Western Maine:						
Franklin	1,093.9	57.0	42.8	994.1	91	2
Oxford	1,332.3	100.6	63.3	1,168.4	88	2
Total	2,426.2	157.6	106.1	2,162.5	89	2

[1]For all other counties, see geographic unit table 32.
[2]Includes nonproductive and productive-reserved forest land.

Table 95.—*Area of commercial forest land in Maine, by ownership classes and selected counties, 1971*

[In thousands of acres]

County[1]	Public-owned[2]		Private-owned		Total
	National forest	Other public	Farmer-owned[3]	Other private	
Androscoggin	—	1.9	47.7	178.7	228.3
Cumberland	—	6.4	50.2	374.0	430.6
Franklin	—	13.9	48.6	931.6	994.1
Kennebec	—	2.5	63.5	324.0	390.0
Knox	—	4.3	25.1	136.2	165.6
Lincoln	—	—	17.5	199.9	217.4
Oxford	37.5	12.4	77.2	1,041.3	1,168.4
Sagadahoc	—	2.3	14.8	113.2	130.3
Waldo	—	10.9	58.6	289.7	359.2
York	—	7.3	62.5	429.1	498.9

[1]For all other counties, see geographic unit table 33.
[2]From ownership records.
[3]Ratios for farmer-owned forest land by county were derived for each geographic unit from the 1964 Census of Agriculture.

Table 96.—*Area of commercial forest land in Maine, by stand-size classes and selected counties, 1971*

[In thousands of acres]

County[1]	Sawtimber stands	Poletimber stands	Sapling-seedling stands	Nonstocked areas	Total
Androscoggin	81.6	59.6	87.1	—	228.3
Cumberland	124.8	92.6	213.2	—	430.6
Franklin	255.6	447.2	281.7	9.6	994.1
Kennebec	76.6	65.2	236.8	11.4	390.0
Knox	32.5	29.8	99.5	3.8	165.6
Lincoln	45.6	37.5	130.0	4.3	217.4
Oxford	297.3	544.3	311.2	15.6	1,168.4
Sagadahoc	44.2	33.4	52.7	—	130.3
Waldo	71.0	69.9	212.7	5.6	359.2
York	147.6	98.0	253.3	—	498.9

[1]For all other counties, see geographic unit table 34.

Table 97.—*Area of commercial forest land in Maine, by stocking-percent classes of growing-stock trees and selected counties, 1971*

[In thousands of acres]

County[1]	Stocking class (in percent)			Total
	70 or more	40 to 70	Less than 40	
Androscoggin	194.3	26.1	7.9	228.3
Cumberland	344.3	62.8	23.5	430.6
Franklin	825.1	133.7	35.3	994.1
Kennebec	316.4	57.1	16.5	390.0
Knox	136.2	23.5	5.9	165.6
Lincoln	183.2	27.6	6.6	217.4
Oxford	976.1	149.2	43.1	1,168.4
Sagadahoc	109.2	15.7	5.4	130.3
Waldo	312.0	38.8	8.4	359.2
York	395.3	75.4	28.2	498.9

[1]For all other counties, see geographic unit table 36.

Table 98.—*Area of commercial forest land in Maine, by forest types and selected counties, 1971*

[In thousands of acres]

County[1]	Forest type						Total
	White pine-red pine-hemlock	Spruce-fir	Oak and oak-pine	Elm-ash-red maple	Maple-beech-birch	Aspen-birch	
Androscoggin	109.3	14.7	31.6	37.2	10.7	24.8	228.3
Cumberland	191.6	21.4	60.8	73.6	26.0	57.2	430.6
Franklin	114.7	302.4	17.1	148.3	336.6	75.0	994.1
Kennebec	99.2	109.8	21.7	73.8	45.5	40.0	390.0
Knox	41.9	47.4	8.8	32.8	19.8	14.9	165.6
Lincoln	54.1	66.7	12.1	42.8	22.8	18.9	217.4
Oxford	146.8	335.2	21.3	168.9	407.5	88.7	1,168.4
Sagadahoc	63.7	7.6	18.3	19.8	6.4	14.5	130.3
Waldo	90.8	112.3	19.5	74.1	37.4	25.1	359.2
York	213.7	20.4	71.4	87.9	36.6	68.9	498.9

[1]For all other counties, see geographic unit table 39.

Table 99.—*Volume of growing stock on commercial forest land in Maine, by stand-size classes and selected counties, 1971*

County[1]	Sawtimber stands	Poletimber stands	Other stands	Total	Sampling error of total
	Million cubic feet				*Percent*
Androscoggin	144.6	77.0	46.7	268.3	13
Cumberland	221.8	117.9	89.1	428.8	11
Franklin	394.3	569.8	137.2	1,101.3	6
Kennebec	128.9	93.4	130.7	353.0	10
Knox	53.6	42.8	58.0	154.4	16
Lincoln	75.6	51.1	77.6	204.3	13
Oxford	483.6	677.0	155.1	1,315.7	6
Sagadahoc	81.3	44.7	26.8	152.8	16
Waldo	113.3	99.2	132.2	344.7	10
York	257.2	120.9	99.2	477.3	11

[1]For all other counties, see geographic unit table 45.

Table 100.—*Volume of sawtimber on commercial forest land in Maine, by stand-size classes and selected counties, 1971*

County[1]	Sawtimber stands	Poletimber stands	Other stands	Total	Sampling error of total
		Million board feet[2]			*Percent*
Androscoggin	396.5	96.8	83.7	577.0	18
Cumberland	606.7	156.4	163.7	926.8	17
Franklin	886.5	555.1	189.9	1,631.5	11
Kennebec	365.5	113.6	147.0	626.1	20
Knox	150.3	52.9	71.3	274.5	32
Lincoln	218.8	58.5	95.9	373.2	25
Oxford	1,098.0	685.6	214.4	1,998.0	9
Sagadahoc	223.1	59.0	49.2	331.3	23
Waldo	319.4	121.6	172.8	613.8	19
York	706.7	159.0	183.3	1,049.0	17

[1]For all other counties, see geographic unit table 46.
[2]International ¼-inch rule.

Table 101.—*Volume of growing stock on commercial forest land in Maine, by forest types and selected counties, 1971*

[In millions of cubic feet]

County[1]	Forest type						Total
	White pine-red pine-hemlock	Spruce-fir	Oak and oak-pine	Elm-ash-red maple	Maple-beech-birch	Aspen-birch	
Androscoggin	161.0	22.5	33.7	25.4	13.1	12.6	268.3
Cumberland	254.4	31.2	59.8	36.8	26.7	19.9	428.8
Franklin	140.4	405.8	27.8	122.4	293.8	111.1	1,101.3
Kennebec	108.4	101.2	16.3	56.0	47.4	23.7	353.0
Knox	46.9	43.3	7.6	26.8	20.3	9.5	154.4
Lincoln	63.5	59.2	11.0	35.8	21.4	13.4	204.3
Oxford	188.0	442.6	34.8	143.3	374.5	132.5	1,315.7
Sagadahoc	92.6	13.7	19.8	12.2	6.9	7.6	152.8
Waldo	103.1	100.8	19.8	66.9	35.6	18.5	344.7
York	283.0	28.2	64.8	41.7	39.6	20.0	477.3

[1]For all other counties see geographic unit table 47.

Table 102.—*Volume of sawtimber on commercial forest land in Maine, by forest types and selected counties, 1971*

[In millions of board feet, International ¼-inch rule]

County[1]	Forest type						Total
	White pine-red pine-hemlock	Spruce-fir	Oak and oak-pine	Elm-ash-red maple	Maple-beech-birch	Aspen-birch	
Androscoggin	404.3	42.8	59.3	37.8	16.7	16.1	577.0
Cumberland	641.5	59.1	103.5	57.0	38.4	27.3	926.8
Franklin	288.5	495.3	63.1	172.8	491.4	120.4	1,631.5
Kennebec	263.4	127.0	34.5	103.0	66.3	31.9	626.1
Knox	112.9	55.0	16.3	50.3	28.0	12.0	274.5
Lincoln	161.5	75.6	23.3	67.7	25.9	19.2	373.2
Oxford	379.0	545.4	78.9	200.1	656.0	138.6	1,998.0
Sagadahoc	232.8	26.8	34.3	18.4	8.4	10.6	331.3
Waldo	244.5	127.3	42.5	131.4	43.9	24.2	613.8
York	725.8	52.8	112.3	64.9	66.3	26.9	1,049.0

[1]For all other counties, see geographic unit table 48.

Table 103.—*Volume of growing stock on commercial forest land in Maine, by species and selected counties, 1971*

[In millions of cubic feet]

Species	County[1]									
	Andro-scoggin	Cumber-land	Frank-lin	Kenne-bec	Knox	Lincoln	Oxford	Sagada-hoc	Waldo	York
White pine	121.6	188.5	102.8	63.3	27.5	37.8	117.5	71.4	60.0	201.5
White spruce	1.3	1.6	33.3	16.8	6.7	8.9	38.2	.5	12.9	1.9
Red spruce	12.7	17.5	163.6	28.4	12.7	15.1	193.2	7.6	28.5	16.4
Balsam fir	4.3	6.2	249.3	39.4	17.2	24.9	270.8	2.6	41.6	5.9
Hemlock	39.0	67.9	49.2	36.4	15.9	19.5	62.7	21.0	34.2	84.3
Other softwoods	1.0	1.3	19.7	16.9	7.7	10.4	20.5	.5	19.1	1.4
Total softwoods	179.9	283.0	617.9	201.2	87.7	116.6	702.9	103.6	196.3	311.4
Red oaks	27.7	46.8	29.7	14.6	6.5	8.9	37.2	16.5	14.6	49.1
Yellow birch	5.2	10.2	83.3	7.2	3.1	4.6	104.1	2.7	7.2	13.3
Paper birch	10.2	15.1	75.3	17.2	7.6	10.7	92.6	5.6	17.9	16.3
Sugar maple	2.1	4.1	80.7	14.8	6.5	7.8	98.7	1.1	13.2	6.0
Soft maples	26.2	41.8	98.2	45.4	20.3	28.5	125.9	13.5	48.7	49.5
Beech	8.0	12.7	44.5	3.9	1.7	2.3	64.0	4.4	3.8	15.1
Ash	1.6	3.2	13.2	9.8	4.5	5.7	16.0	.8	10.6	4.2
Aspen	5.7	8.4	52.6	11.6	5.1	6.1	67.2	3.6	11.0	8.1
Other hardwoods	1.7	3.5	5.9	27.3	11.4	13.1	7.1	1.0	21.4	4.3
Total hardwoods	88.4	145.8	483.4	151.8	66.7	87.7	612.8	49.2	148.4	165.9
All species	268.3	428.8	1,101.3	353.0	154.4	204.3	1,315.7	152.8	344.7	477.3

[1]For all other counties see geographic unit tables 58 to 66.

Table 104.—*Volume of pulpwood* on commercial forest land in Maine, by species and selected counties, 1971*

[In thousands of cords—soundwood, excluding bark]

Species	Counties within the Capitol Region, Casco Bay, and Western Maine Units									
	Androscoggin	Cumberland	Franklin	Kennebec	Knox	Lincoln	Oxford	Sagadahoc	Waldo	York
White pine	1,474	2,296	1,264	819	350	482	1,448	865	756	2,461
White spruce	16	20	399	201	81	107	458	6	156	22
Red spruce	159	218	2,000	340	152	182	2,361	95	345	206
Balsam fir	54	75	2,981	472	206	299	3,240	32	499	73
Hemlock	506	902	688	461	202	250	882	269	442	1,149
Other softwoods	15	25	306	226	102	140	317	8	254	28
Total softwoods	2,224	3,536	7,638	2,519	1,093	1,460	8,706	1,275	2,452	3,939
Red oaks	346	580	356	173	77	105	444	205	172	613
Yellow birch	62	120	1,096	85	36	55	1,364	34	85	158
Paper birch	124	181	933	208	92	128	1,144	67	215	196
Sugar maple	28	56	1,024	180	79	92	1,253	14	159	85
Soft maples	340	545	1,246	570	257	359	1,586	179	618	635
Beech	108	174	547	46	20	28	787	60	45	204
Ash	21	46	167	115	53	69	201	10	125	61
Aspen	67	99	628	140	64	73	804	42	130	95
Other hardwoods	50	110	241	408	170	201	276	29	332	121
Total hardwoods	1,146	1,911	6,238	1,925	848	1,110	7,859	640	1,881	2,168
All species	3,370	5,447	13,876	4,444	1,941	2,570	16,565	1,915	4,333	6,107

CONTINUED

Table 104.—Continued

Species	Counties that are also geographic units						State total
	Aroostook	Hancock	Penobscot	Piscataquis	Somerset	Washington	
White pine	656	385	1,544	2,374	754	879	18,807
White spruce	3,883	441	925	1,653	1,367	692	10,427
Red spruce	15,031	3,568	5,841	12,804	8,465	6,305	58,072
Balsam fir	21,997	1,279	5,653	9,984	11,270	3,328	61,442
Hemlock	1,114	995	3,728	1,029	984	1,781	15,382
Other softwoods	5,806	1,387	2,741	3,399	2,008	1,941	18,703
Total softwoods	48,487	8,055	20,432	31,243	24,848	14,926	182,833
Red oaks	—	168	169	128	12	202	3,750
Yellow birch	1,747	161	776	1,533	2,063	324	9,699
Paper birch	1,147	546	669	979	1,481	1,045	9,155
Sugar maple	4,290	215	1,440	3,163	3,154	292	15,524
Soft maples	2,747	1,053	2,958	2,104	2,661	2,728	20,586
Beech	2,440	207	1,019	1,767	952	194	8,598
Ash	808	181	605	512	321	291	3,586
Aspen	2,805	171	664	499	999	712	7,992
Other hardwoods	631	118	658	509	715	96	4,665
Total hardwoods	16,615	2,820	8,958	11,194	12,358	5,884	83,555
All species	65,102	10,875	29,390	42,437	37,206	20,810	266,388

*Pulpwood volume is the total of all growing-stock volume plus the soundwood volume in other trees classified as rough trees.

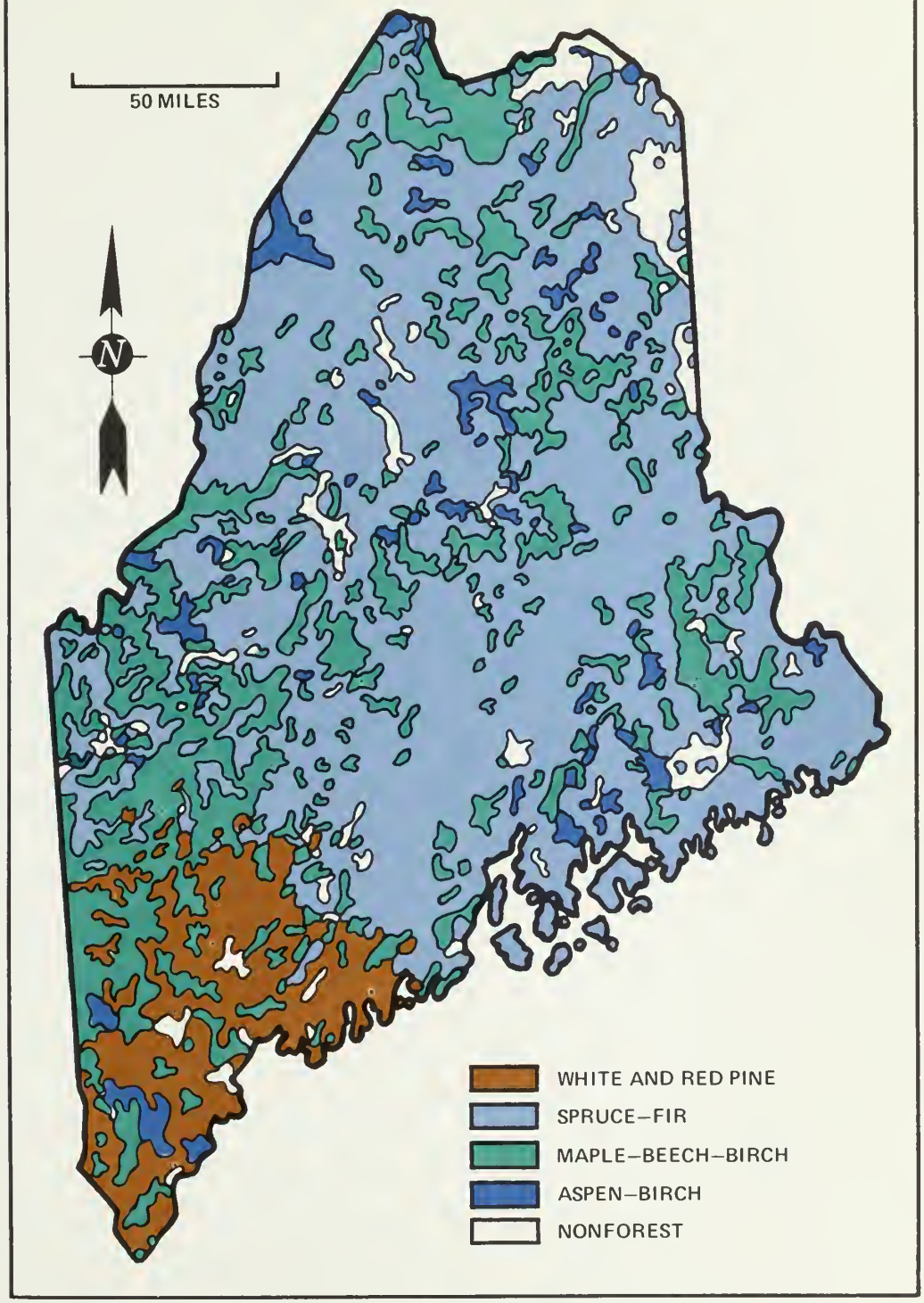
Table 105.—*Volume of sawtimber on commercial forest land in Maine, by species and selected counties, 1971*

[In millions of board feet, International ¼-inch rule]

Species	County[1]									
	Andro-scoggin	Cumber-land	Frank-lin	Kenne-bec	Knox	Lincoln	Oxford	Sagada-hoc	Waldo	York
White pine	359.7	549.3	278.9	200.9	86.8	123.5	307.1	211.0	185.8	585.0
White spruce	—	—	50.8	22.6	9.8	12.4	58.4	—	21.2	—
Red spruce	21.7	30.4	219.8	45.5	19.1	25.0	266.6	13.2	40.5	28.6
Balsam fir	4.6	7.1	236.1	24.0	10.8	16.2	256.7	2.7	27.2	7.3
Hemlock	82.8	157.8	102.1	98.9	42.0	55.0	133.8	45.1	90.4	209.1
Other softwoods	—	—	34.4	24.2	11.4	14.7	34.9	—	27.9	—
Total softwoods	468.8	744.6	922.1	416.1	179.9	246.8	1,057.5	272.0	393.0	830.0
Yellow birch	62.0	103.7	63.6	34.3	16.3	23.9	81.3	36.2	44.3	111.8
Yellow birch	4.0	8.9	172.9	19.8	8.3	12.8	220.9	2.0	19.3	14.1
Paper birch	7.6	11.6	58.0	17.2	7.0	10.1	77.0	4.1	14.1	13.2
Sugar maple	3.0	7.4	163.9	17.5	7.7	9.5	208.4	1.1	15.9	14.3
Soft maples	21.4	32.4	114.8	42.5	20.1	29.6	151.6	10.3	54.9	40.7
Beech	4.0	8.2	38.4	3.8	1.6	2.3	79.1	2.3	3.4	13.0
Ash	2.9	4.7	22.7	11.4	5.0	5.4	26.4	1.7	9.8	5.0
Aspen	1.0	1.4	58.6	8.8	3.8	3.4	76.7	.7	6.6	1.1
Other hardwoods	2.3	3.9	16.5	54.7	24.8	29.4	19.1	.9	52.5	5.8
Total hardwoods	108.2	182.2	709.4	210.0	94.6	126.4	940.5	59.3	220.8	219.0
All species	577.0	926.8	1,631.5	626.1	274.5	373.2	1,998.0	331.3	613.8	1,049.0

[1]For all other counties, see geographic unit tables 67 to 75.

THE MAJOR FOREST TYPES IN MAINE
1971



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